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BRIEFLY TOLD.

AN EXCEPTIONALLY GOOD MEETING.—The November meeting of the New York Section of the Illuminating Engineering Society, which was held on Thursday evening, the 12th inst., in the St. Gabriel's Branch, Carnegie Library, East 36th street, New York, well deserves the caption given this mention of it. The object of holding the meeting in the Library was twofold. First, to give the members an opportunity to examine and discuss the lighting installation; second, that the designer has the benefits of the discussion to use in respect of several similar buildings now under construction. The illumination plan of the building was proposed by the first President of the Society, Mr. L. B. Marks, and the installation was described, together with measurements of the illumination, in a paper presented at the recent convention of the Society in Philadelphia. The meeting having been called to order by Mr. Albert Wahle, the installation was described briefly by Mr. Marks. The visitors were quite as numerous as the members, including the Chief of the Circulation Department of the New York Public Libraries, Mr. Bostwick, and a number of the librarians in charge of the various branches throughout the city. A feature of the illumination of this building is that it was the first to be erected where local lighting was provided. Prof. Brooks, of the University of Illinois, cited an instance where it was thought sufficient illumination for reading had been arranged for, but upon some of the tables reading lamps had been set, and as the students invariably selected these tables, some speculation as to efficiency was aroused; but he thought the reason for such choosing was "the attractiveness and cosiness," as he expressed it, of a table lamp. The installation was also discussed by Messrs. Lansingh, Moore, Barton, Owens, Wahle, Millar and Doane. From the discussion it would be hardly fair to state that this particular type was altogether successful, although none of the members mentioned an installation where only general lighting was provided where results were as satisfactory as in the case under discussion. The members were the guests of the librarians of the city, and through their hospitality refreshments were enjoyed by all.

CURRENT MENTION.—

THE Sullivan Brothers, of Flushing, L. I., inform us that they are completing a 5-mile run of high pressure, 4-inch distributing line for the New York and Queens Gas Company, from its works in Flushing to the outlying district of Bayside, L. I. Manager Spear of the Company, while not especially looking for trouble these days, is wondering what his Directors will say to him next spring when he officially informs them that it would be the part of prudence, if not the demand of necessity, to add to their distribution system sections of piping that will in the end aggregate 10 miles. By the way, it is here our pleasant province to note that Mr. Spear has surely made good, in the speech of the day, in his administration of the affairs of the Flushing Company. This knowledge must be all the more satisfactory to Mr. Spear when, in retrospect, he calls up the remarkable supply of "executive ability" that ruled in the management of the corporation at the time he took charge of the engineering end of its fortunes.

THE Messrs. Sullivan are also under contract to lay 5 miles of low pressure, cast iron pipe to and through the Woodmere district of the Queensboro Gas and Electric Company, of Far Rockaway, L. I. Mr. Lewis B. Sharp, General Manager of the Company, seems to be gradually coming over to the ideas advanced to him 2 years ago or so by Mr. William H. Sullivan, when the latter then claimed that not the least attractive part of the Company's business field was that given over to its gas section.

MESSRS. H. M. BYLLESBY & CO., of New York and Chicago, informs us that the usual quarterly dividend of 1¼ per cent., on the preferred stock of the Mobile (Ala.) Electric Company, is payable to-day to shareholders of record of the 9th inst. Mention of the Byllesby Company brings to mind the further fact that, in the annual report to the shareholders of the Commonwealth Edison Company, of Chicago, for the twelvemonth ended September 30, 1908, President Insull, in his report to the Directors, stated it looked advisable, in opening the books of account of the Company, to have made a detailed inventory and valuation of the property and business acquired through consolidation. The Directors agreed it would be a wise thing to do, and the ultimate result was the employing by the firm of H. M. Byllesby to make the inventory and valuation. This they did, and it was on their finding in these respects that the basis was made for the initial investment entries on the Commonwealth Company's books.

MR. E. W. BROWN has severed his connection with the United States Meter Company, of Brooklyn, N. Y., in order to take up duties of a responsible nature with the Keystone Meter Company, of Royersford, Pa.

LIBRARY OF CONGRESS NOV 16 1908 SMITHSONIAN DEPOSIT.

THE proprietors of the Portland (Ind.) Gas Company have put into effect a new rate schedule, the main features of which are: For the first 3,000 feet or fraction thereof the rate shall be $1 per 1,000; for each 1,000 feet additional, the charge shall be 50 cents per 1,000. Of course, monthly use is meant. They also announce that in a short time a final schedule will be put forth.

MR. SAMUEL T. MURDOCK, in commenting on the recent changes in the personnel of the force of the Indiana Illuminating Company, in connection with its Fort Wayne branch, which changes were noted in the JOURNAL for last week, says that the resignations of Messrs. H. C. Paul, G. Max Hofmann and Lothar Hofmann, were purely voluntary. Mr. Murdock further said that Mr. G. E. Mulholland will have active charge of the Fort Wayne plant, besides being the Assistant General Manager of all the plants of the Indiana Illuminating Company. Mr. Frank H. Cutshall will remain at Fort Wayne as Assistant Manager. In further proof of his regard for Mr. Paul, Mr. Murdock said: "The policies instituted by Mr. Paul will be continued. His policies were good, and so they are certainly good enough for me."

THE quiet, persevering person who manages the affairs of the Meriden (Conn.) Gas Light Company (Mr. Charles A. Learned) has again convinced his Directors that a cut in the selling rate would be a good thing all around. The new schedule puts the gross figure at $1.20 per 1,000 cubic feet, with a discount of 10 cents per 1,000 on all bills settled within 10 days. The new schedule goes into effect on all consumption registered after December 31st.

THE Boston Consolidated Gas Company has prepared an illustrated circular respecting the comparative merits as illuminators of tungsten (electric incandescent) lamps and inverted mantle gas lamps, which is being spread plentifully over and through the many districts which go to make up the city of Boston. The matter contained in the circulars is also being reprinted on a large scale on the advertising pages of all the leading Boston newspapers. In summing up the respective and relative costs of using the gas and the tungsten burners this showing is made:

	Gas.	Electricity.
Consumption per hour	3.22 cubic feet.	100 watts.
Cost per hour. Gas at 80 cents; electricity at 10 cents, rather than 12 cents, as advertised	¼ cent.	1 cent.
Cost for 10 lamps burning 5 hours a day for 4 months	$12.50	$50
Cost for renewals and maintenance	4.00	11
Total cost	$16.50	$61

The statement is also very positive over the fact that the illumination afforded by gas is far greater than that obtainable from the tungsten type of illuminator.

MR. WILLIAM J. CLARK, Vice-President of the Westchester Lighting Company, of Mount Vernon, N. Y., following the work initiated by him when he was in charge of the new business division of the Consolidated Gas Company, of New York, has not lost sight of his present post of duty of the advantages which accrue to the Company through properly training its employees, in which tuition is a well regulated strain of fraternal mingling. For the long evenings a series of "talks" has been arranged for the benefit of the men, which will be held in the Company's handsome and commodious assembly room. The initial session will be held next Thursday, at 8 P.M., and the programme calls for a "talk" by Dr. Goodwin, on "First Aid to the Injured." Following this will be the opening of a Question Box, and a discussion of its contents. The ending number will be the rendering of musical selections, accompanied by *light* refreshments. The gentleman who so kindly posted us on this to be-happening, remarks, respecting the ending of the assembly, "I use the word 'light' advisedly, and as being particularly *apropos* of the occasion." We hope to report the proceedings.

THE San Francisco Gas and Electric Company has completed plans for the erection of a 6-story office building on the south side of Sutter street, a short distance east of Powell street. The estimated cost of the structure is $75,000.

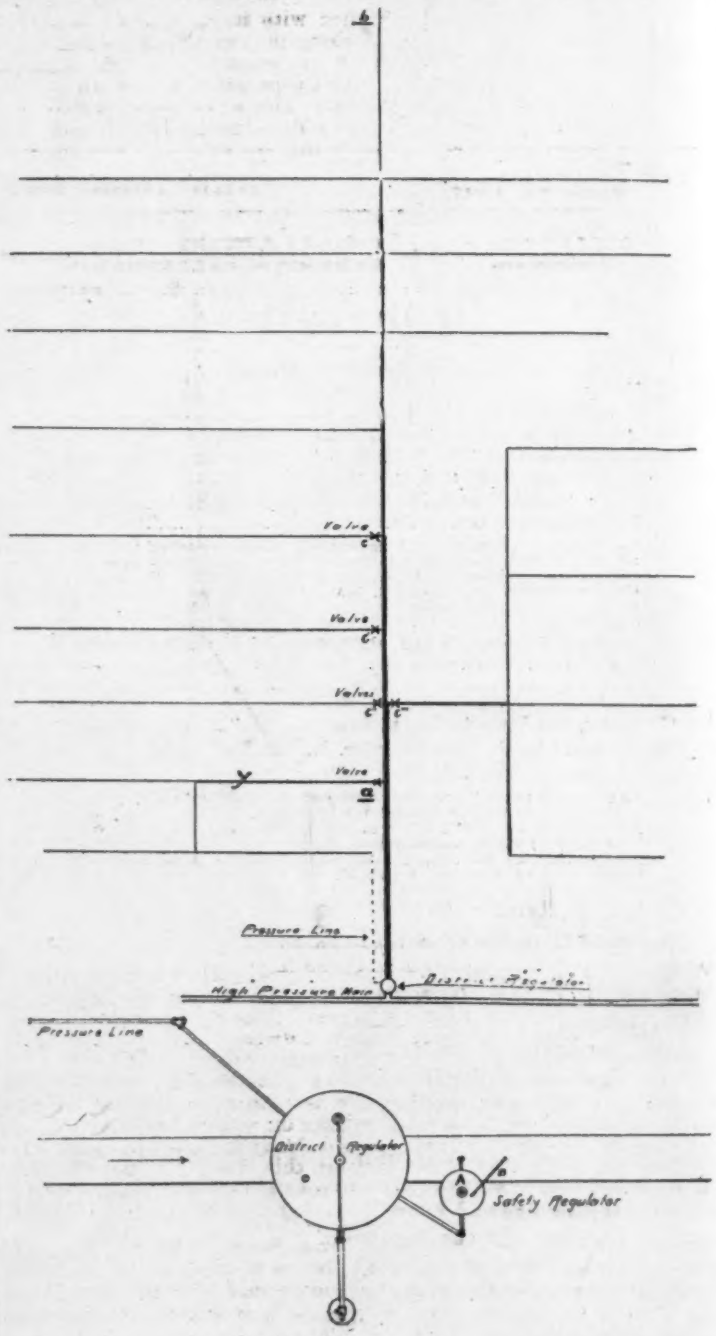
THE proprietors of the Champaign and Urbana (Ills.) Gas Company announce that on the 1st of January the net rate will be $1.12½ cents per 1,000 cubic feet, a cut of 12½ cents.

AT the annual meeting of the shareholders of the San Jacinto and Hemet Gas Company, held in Redlands, Cal., the officers elected were: Directors, R. J. Dunn, Walter M. Campbell and C. M. Brown; President, R. J. Dunn; Vice-President, W. M. Campbell; Secretary and Treasurer, A. E. Brock.

[Continued from Page 797.]

Wrinkle Budget for 1908, Submitted by Mr. Milan R. Bump, as Editor of the Wrinkle Department, The American Gas Institute.

No. 25. Distance Street Pressure Regulations.—The district regulator is placed at point between the high pressure and the low pressure systems. A section of main marked *Y*, with a good number of consumers, is cut out so that its whole gas supply enters at one point *A*. At this point a throttling valve is installed. Instead of the usual method of connecting up the diaphragms to outlet of the regulator, the cut-out section *Y* is connected to district regulator diaphragm chamber by a 2-inch pressure line. The regulator is set at 25-tenths,

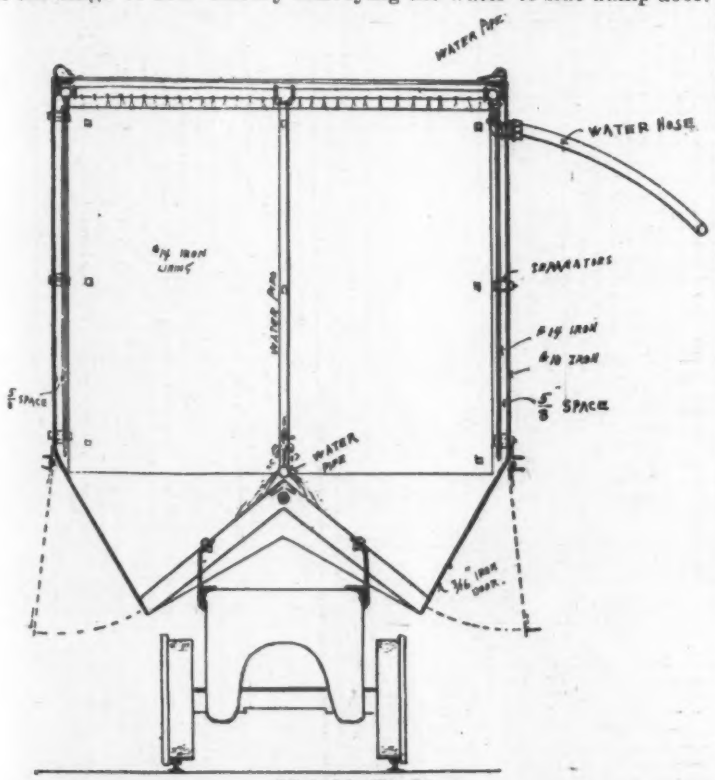


Wrinkle No. 25.

and the valve at point *A* is throttled so that as the gas demand in district *Y* increases the drop in pressure through the opening at point *A* becomes greater and the pressure in main *Y* becomes less, which in turn opens district regulator, thus raising the pressure in the system and automatically maintaining pressure desired at *B*. To keep the outlet pressure from exceeding any desired limit, the diaphragms are connected by a 1-inch line to outlet of regulator. A 1-inch Crawford regulator *A* (second illustration) is set in this line. The gas opening to under side of diaphragm is closed and a gas connection *B* is made to the top of the diaphragm. The diaphragm and gas pressure are counterbalanced by a spring in the top of the regulator. The small regulator can be set so that it can open at any desired pressure and close down main regulator to that pressure. Where it is necessary to

raise the maximum pressure at the outlet of the district regulator higher than that at which it would be good practice to deliver gas to the consumer, in order to get sufficient pressure at point *B*, the valves *C*, *C'*, *c''*, etc., can be installed, cutting off lateral mains from feed main. Any desired pressure can be obtained in these mains by throttling these valves, setting same at time of peak load. The effect and operation are the same as on system *Y*.—V. F. DEWEY, Detroit, Mich.

No. 26. Hot Coke Car.—Where conditions are such as to protect steel coke cars from the action of large volumes of hot coke coming out of retorts with a rush, the fitting up of cars as shown will extend the life very much. The car receives the coke from retorts above and is pushed away from bench and quenched under a hood to receive the steam, carrying it out of the building. This device is only to protect the body of car while being filled. The outside of car is made of No. 10 steel, with ¾-inch pipe perforated with holes, running around the top, under angle iron frame and along the top of gable bottom of car. The car is provided on the inside and ends with a light steel liner No. 14 gauge, bolted on with ¾-inch separator, leaving an air space between the body of car and liner. The water spray is directed on the inside of the liner. As shown on drawing the liner extends down to the hinge of door thereby conveying the water to side dump door.

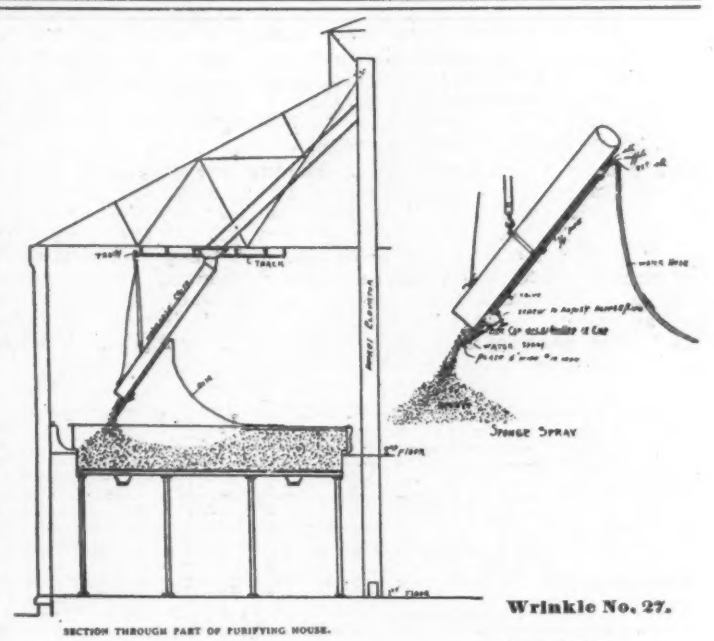


Wrinkle No. 26.

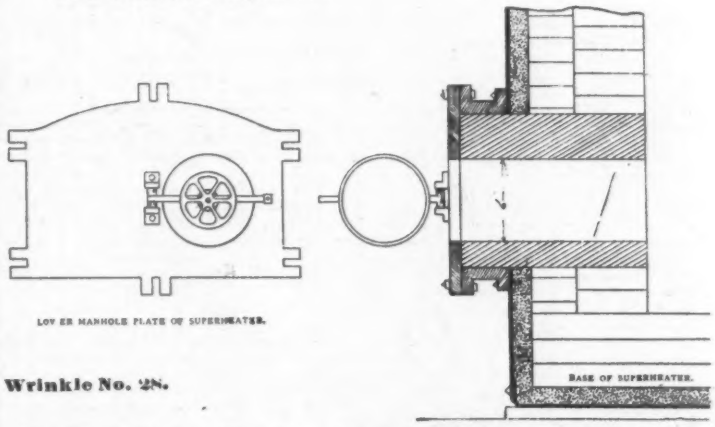
Without this liner part of water would pass out through the joint at hinge and fail to pass over door of car. The opening at this point allows the rush of steam which is formed by the water on gable bottom and door to go up through the space between the main body of car and liner and out at top of car. This steam helps to protect the liner. The sides and ends of car always become the hottest, due to the draft having the least resistance there. When liners are burnt out, due at times to careless workmen not turning on water, they can be easily renewed by bolting on others, cut and ready for that purpose. The average life to the body of car without this liner is 6 months, with the liner 12 months, using car continuously day and night.—FRANK HUBER, Louisville, Ky.

No. 27. Spray for Dampening Iron Sponge.—Where purifying material is elevated and conveyed to boxes through chutes as shown, the water spray gives the sponge an additional wetting, spraying on the sponge as the box is being filled. As it is important to have the proper degree of moisture in the material, the device enables the foreman to adjust the amount of water desired, wetting it uniformly. The spray is made by boring a number of small holes into the end of a ¼-inch pipe cap screwed on the end of pipe bolted to the center line of chute. A valve is provided close to the end of chute in easy reach of operator. Hose connection should be provided at top in order that one length of hose will do for a number of chutes. In addition a baffling plate is fastened to the pipe by an iron band, pivoted in order to adjust the spray, directing the water into the stream of sponge as it comes out of the spout.—FRANK HUBER, Louisville, Ky.

No. 28. Superheater for Decarbonizing.—A hole 6 inches in diameter is made in the bottom manhole plate of the superheater and a cap, such as is used on top of standpipes, is bolted on as shown. When burning out of superheater is required the cap is cracked partly and a torch or lighted piece of waste is held over to guard against reports, such as is done in touching off mouthpieces on retorts. The cap being hinged any size opening can be adjusted that will be required to burn out carbon.—FRANK HUBER, Louisville, Ky.

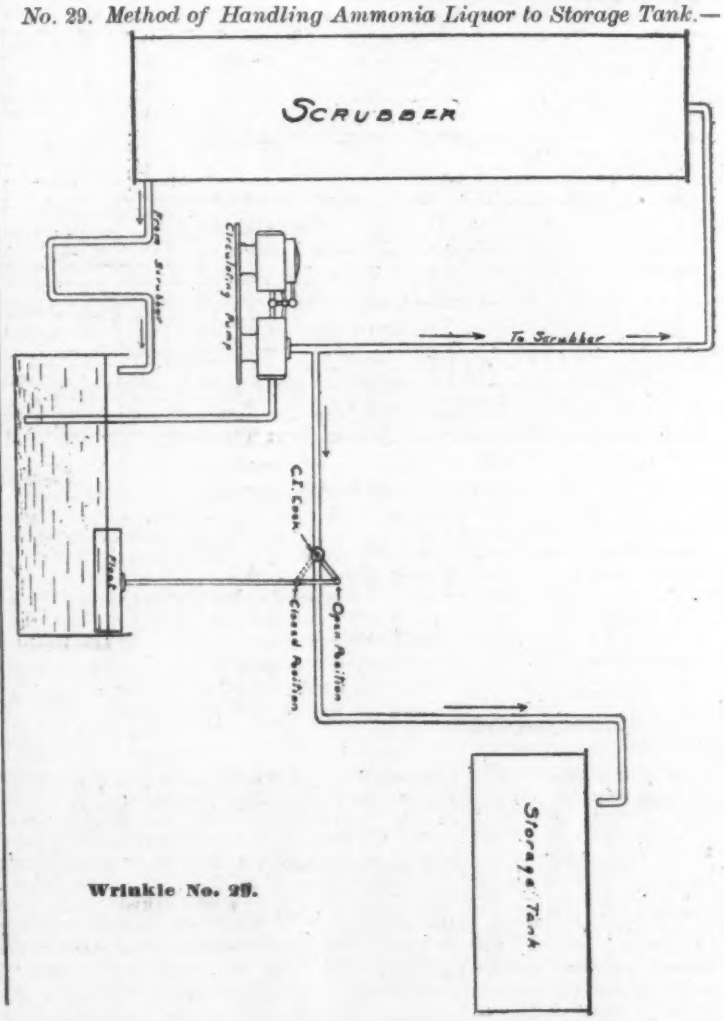


Wrinkle No. 27.



Wrinkle No. 28.

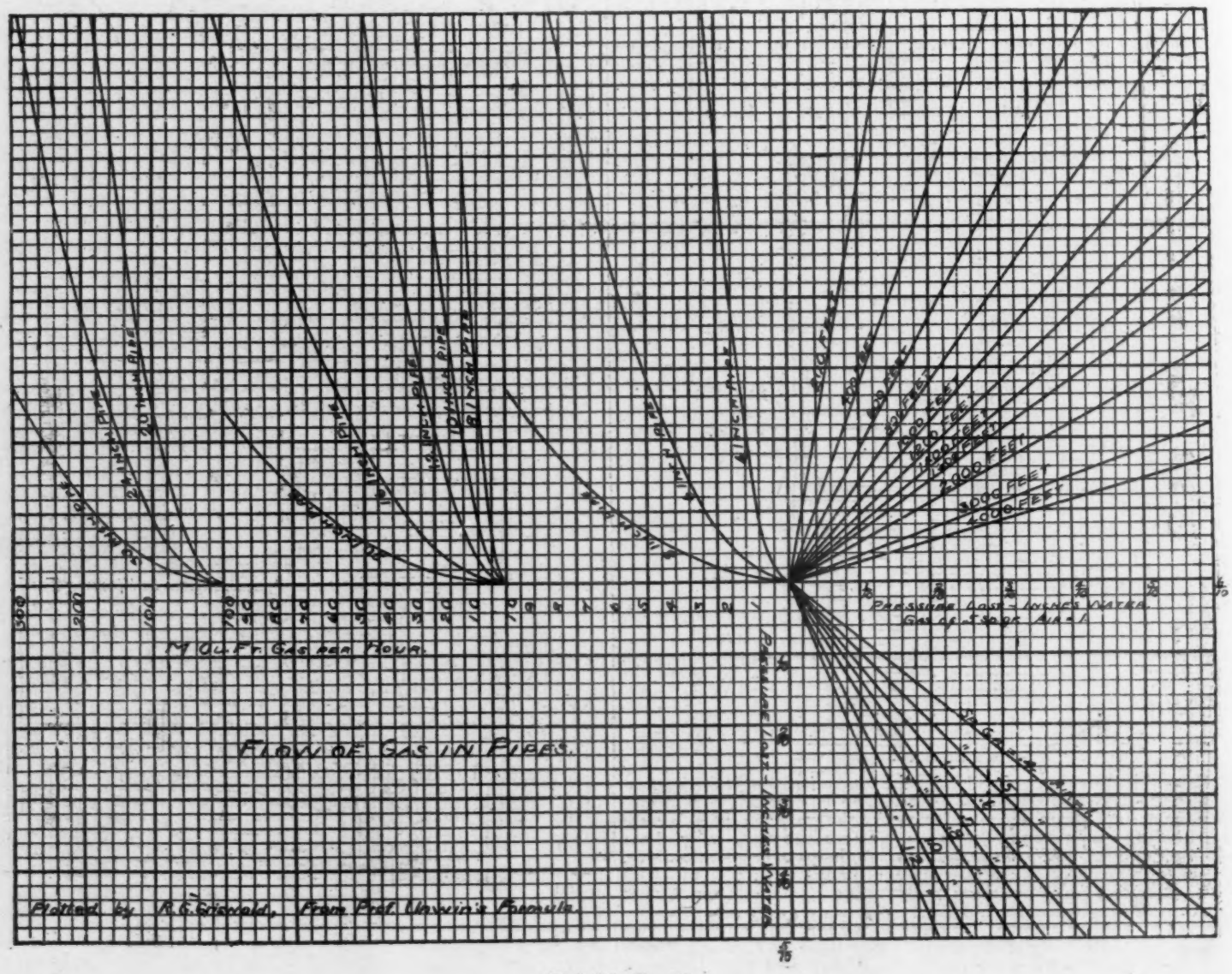
No. 29. Method of Handling Ammonia Liquor to Storage Tank.—



Wrinkle No. 29.

This arrangement was adopted to avoid the use of a separate pump for elevating liquor to the storage tank and has given excellent satisfaction.—R. G. GRISWOLD. Denver, Col.

No. 30. *Curves for the Flow of Gas.*—These curves are plotted according to Prof. Unwin's formula. The first one is designed to solve distribution problems and the second for selecting the size of fuel runs to special appliances. It will be found that any problem within the limits of the curves can be solved very quickly and accurately. For example: An appliance using 500 cubic feet per hour is set 70 feet from the meter. If we can sacrifice $\frac{3}{10}$ inches of pressure, what size pipe must be run? Starting at the point marked "$\frac{3}{10}$" run up to the line marked "70 feet," from here run to the left to "500 cubic feet." This coincides with the line marked "1¼-inch pipe," which is the size necessary.



Wrinkle No. 30.

Again: 60,000 cubic feet of producer gas of $\frac{1}{10}$ gravity must be transmitted 1,000 feet with $\frac{3}{10}$ inch loss of pressure.

What size of pipe is necessary?

(First curve.) Start at "$\frac{3}{10}$" on perpendicular line marked "Prescure Lost" run to "Sp. Gr. = 1.0" run up to "1,000 feet" run left to 60 M. This comes between 20 inches and 16 inches. If the 16-inch were used what would the loss in pressure be?

Solution: "60 M" to "16-inch" to "1,000 feet."

To gravity = "1.0" to "$\frac{5}{10}$" which is the pressure lost.—R. G. GRISWOLD, Denver, Col.

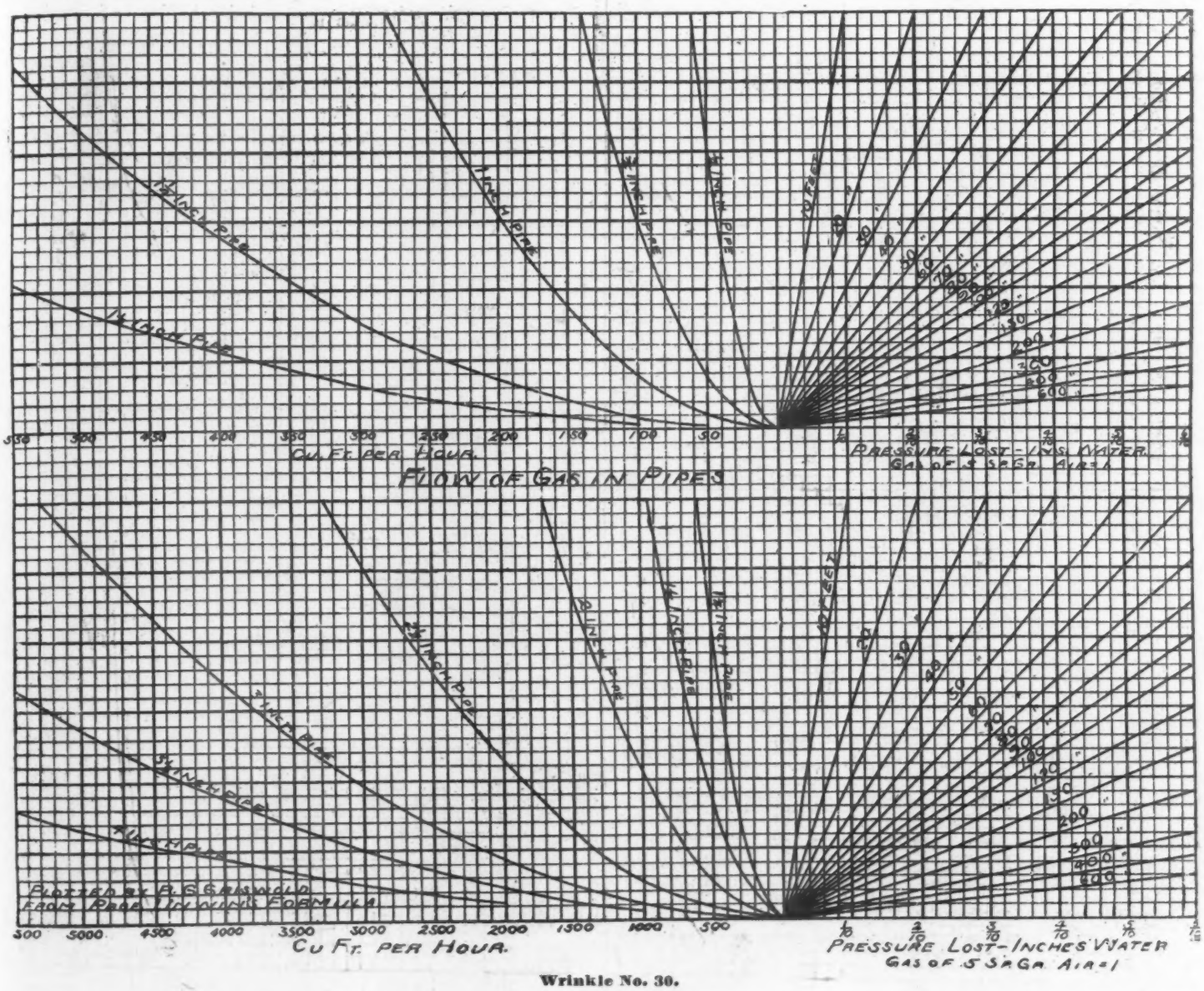
No. 31. *A Special Tee.*—Desiring to run a 16-inch branch from a 16-inch foul main at a point between the exhauster and retort house, this special tee was cast. At the point selected an opening was marked out equal in area to a 16-inch pipe and diamond pointed nearly through. A cut was also made across this piece to facilitate its removal, and a screw eye tapped into each half. The special tee was then bolted on, and the lead joints run and calked. An open valve was then bolted to the flange, the vacuum was adjusted nearly to atmosphere, the pieces broken out and removed and the valve closed. By this means the foul main was not open more than 10 minutes and its operation was not interrupted at all.—R. G. GRISWOLD, Denver, Col.

No. 32. *Proving Head Gauges.*—The spring brass meter proving head gauge here shown is designed to measure a movement of the proving head pointer, the movement being gauged as fractional parts of a complete revolution of the pointer. The gauge is applied so that the small hole will be central over the proving head spindle, and one leg of the notched out division of the gauge will be in line with the original position of pointer at time of starting test, this original position having first been marked with a dot of ink or chalk on the index glass. The other leg of the notched out division will show whether or not the proving head pointer has moved the fractional part of a complete revolution, as per the particular division of the gauge applied. Where slow motion or burner tests are made according to a stated movement of the proving head pointer in a given time, or where it is desired to measure the movement of the pointer (stating size of proving head), in order to determine gas leakage, this gauge will be found to be of great service.—THE UNITED GAS IMPROVEMENT COMPANY, Philadelphia Gas Works, Department of Distribution.

No. 33. *Credit Dial Gauges.*—The brass gauges here shown are used in determining the credit indicated on circular, or rectangular, credit dials of prepayment meters at the time of lifting money from the cash boxes. These gauges should be so divided that each principal division will represent the motion of the pointer caused by the inserting of a quarter; or in other words, will show a 25-cent credit, for the price at which the gas is sold. This renders the meter readers independent of any divisions which may be printed on the dial, and which may not, and frequently do not, correspond to the selling price at which the meter is set. For instance, the circular dial here shown is divided for $1.25 gas, while the circular gauge shown is one that would be used for $1 gas. In use, the circular gauge is placed so that the sides of the projection correspond to the "Start" and "Stop" lines on the credit dial. Where the divisions on the credit dial are incorrect for the price at which gas is sold, or where there are no divisions on the credit dials, gauges of the types shown will be found to be of very great service.—THE UNITED GAS IMPROVEMENT COMPANY, Philadelphia Gas Works, Department of Distribution.

No. 34. Dehydration of Blast Air.—The possibility, or rather the practicability, of dehydrating blast air for water gas sets is herewith tentatively suggested as a means for promoting fuel economy, increasing the capacity of the apparatus, and reducing the power and facilitating the operation of the sets. The conclusion has as its basis the very successful results obtained in blast furnace practice, an example of which is herewith cited as extracted from the report by Joseph H. Hart, Ph.D., upon the Isabella furnace at Ætna, Pa., showing the following significant figures:

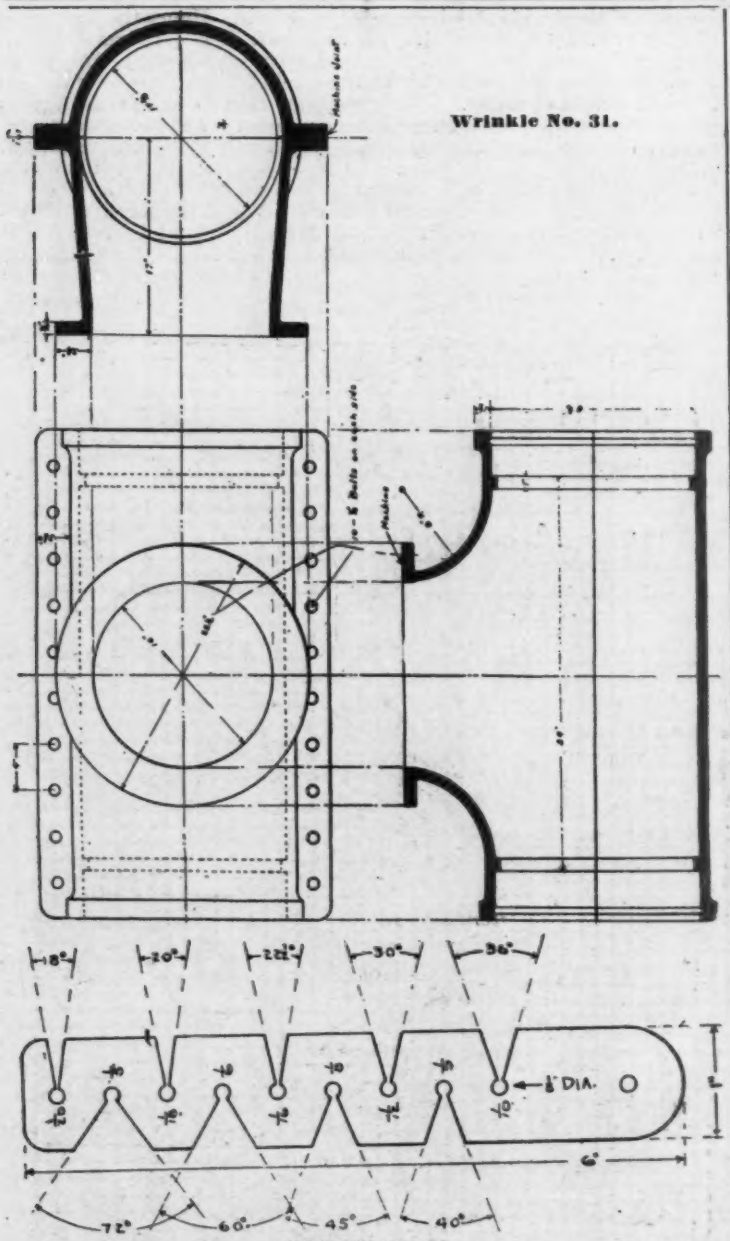
Original Conditions.—The Isabella furnace at Ætna, Pa., produced 350 tons of iron. Consumed 2,147 pounds of coke. Required 40,000 cubic feet of air per minute. Installed two ammonia compressors, 225 tons of ice melting capacity; one used as a standby for peaks. Air cooled from 80° to 28° F., or reduced 52°. Reduction of moisture



Wrinkle No. 30.

averaged from 5.66 grains per cubic foot to 1.75, or an elimination of 3.91 grains per cubic foot.

Results.—Air reduced to 34,000 cubic feet per minute, or a saving of 6,000 cubic feet per minute, a reduction of about 15 per cent., this being due to increased density of the air handled. The blowers were slowed from 114 to 96 r.p.m., a reduction of 18 r.p.m. The consequent reduction in horse power was from 2,700 to 2,013 or 687-horse power. The refrigerating apparatus required about 530-horse power, and there is still a net saving in power of 157-horse power when operated at maximum capacity. The moisture content which passes through the furnace was approximately 40 gallons of water per hour, at times being increased to 300 gallons, due to variability in humidity, which is very wide, especially in some locations. About 10 tons of water per day were extracted and the output increased to 450 tons of iron, a gain of 100 tons, or about 28 per cent. The coke consumption was reduced from 2,147 or 1,729 pounds, a saving of 418 pounds per ton of iron output, or, roughly speaking, 20 per cent. The argument for the use of dehydrated air in connection with water gas sets would be as follows: First a reduction of fuel due to reduced blasting period by reason of the denser quality of the air. and resulting high flame temperature subtending a saving in loss by radiation, abstraction of heat by aqueous products of combustion, etc. The increase of capacity of the sets is manifestly due to the higher flame temperature in the combustion of the fuel in the dryer and denser air. Hence the shortening of blast period, and permitting an increased duty performed by the apparatus during time unit. The saving in power would likely occur in the handling of a denser air and the relief from handling the additional weight of water. It is by analogy that blast furnace figures would show some increment or net economy over and above the power required for the ammonia compressors. In any event the reduction in duty performed by the speed of the fans would at most prove a standby for the outlay of power for the compressors. With regard to facility of operation and general efficiency it is extremely likely that with the drier and denser air the blast pressure would be materially reduced, and there would be a consequent reduction of channeling and chimneys through the fuel bed. Hence a lessening of clinkering with a consequent necessity of difficult stoking. It is also probable that the dry air would subtend conditions of more equal heat throughant the entire fuel bed, inasmuch as that under ordinary conditions the strata of fuel in first contact with the humid air is chilled, its heat being abstracted while the succeeding stratum are overheated from the lack of this endothermic connection and the combustion of the gases which it forms. This condition of equal heat throughout the fuel would make a minimum of clinker formation and a maximum of gas making efficiency, the fuel relieved of the "deadening" influence of the aqueous vapor prior to the steam injection. The above seem at least worthy of consideration. It is understood, of course, that the efficient operation of such a plant would require a works of such size as to maintain a fairly high load factor upon the blast air, that is to say, the layout of sets should be such an arrangement as to produce by their rotation intervals as nearly as possible of constant demand upon the blast. This, although not absolutely indispensable, would tend to the maximum efficiency of the plant proposed. A tentative layout of the foregoing arrangement is herewith appended. For a plant requiring, say 15,000,000 cubic feet of air per 24 hours, a multiple or factor of same being, roughly speaking, proportional. Reduction of temperature from 85° to a temperature of from 26° to 28°. Humidity calculated at 80 per cent. saturation. Equipment consisting of two batteries of direct expansion pipe in coils of 15,000 feet of 2-inch pipe each, and having separate expansion shut offs and other connec-



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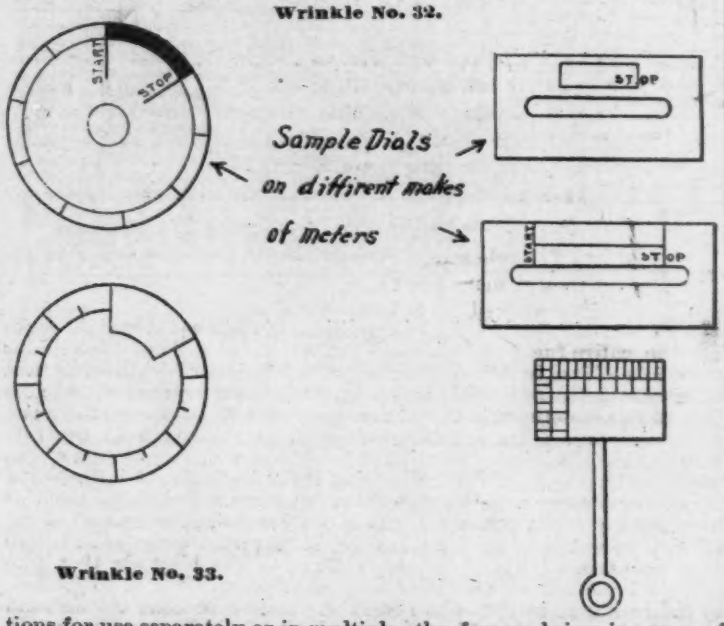
Wrinkle No. 32.

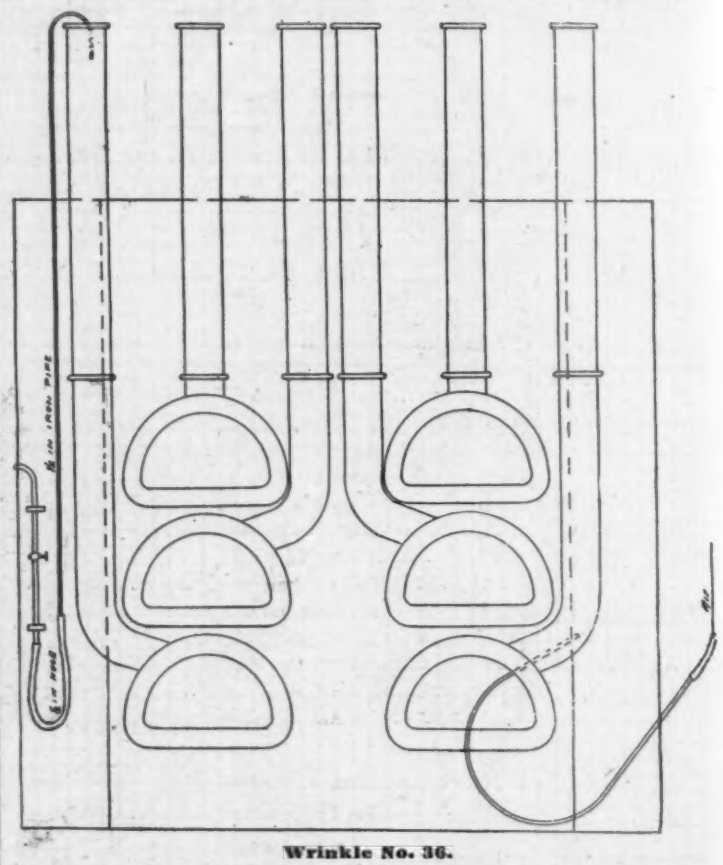


Wrinkle No. 33.

tions for use separately or in multiple, the former being in cases of low load or during continuous operation, to permit coils to be defrosted or repaired. Ammonia compressor, or compressors to be the equivalent of compressor 13-inch bore and 30-inch stroke, the condenser being atmospheric in 6 sections of 24 2-inch pipes, 20 feet long. The compressor to be driven by 125-horse power, 220-volt motor, running at 700 r.p.m., belt connected. The total cost of the foregoing plant as estimated upon by several ice machinery companies is between $20,000 and $22,000, erected complete.—M. N. LATTA, Olympia, Wash.

No. 35. Method of Repairing Cement Joints on a High Pressure Main without Reducing the Pressure.—We recently had occasion to repair some leaking cement joints on a 16-inch main carrying 5 pounds pressure; it not being convenient to shut down the line, the following method was used: A caulker was supplied with an "anti-asphyxiator" which was fastened over his mouth and nose, the tube being led to windward of the excavation, insuring a supply of fresh air. He then cut out the cement joint for a space of 6 inches and caulked "lead wood" into this space for a depth of about 1 inch, then removed another section of the cement, substituting lead wool until all the cement in the joint had been removed. A pouring band was then used, and a lead joint run and caulked in the usual manner.—JACOB D. VON MAUR, St. Louis, Mo.

No. 36. Plan for Piping Compressed Air to Front of Benches.—The accompanying sketch shows a plan for piping compressed air to the front of the benches for cleaning the ironwork and also for cleaning standpipes. This method is both quick and efficient in cleaning stopped standpipes and has been used very successfully by our company.—MR. —— STOUT, Spokane Falls (Wash.) Gas Light Co.



Wrinkle No. 36.

[CONTINUED FROM PAGE 803.]

SIXTEENTH ANNUAL MEETING, PACIFIC COAST GAS ASSOCIATION.

HELD IN SANTA CRUZ, CAL., SEPTEMBER 15, 1908.

SECOND DAY—MORNING SESSION.

ROUTINE BUSINESS.

The President in calling the meeting to order announced that the first business would be the Report of the Board of Directors. This was read, and on motion, was adopted as read. Then followed this

REPORT FROM COMMITTEE ON PRESIDENT'S ADDRESS.

SANTA CRUZ, September 16, 1908.

Your Committee to whom was referred the President's address begs to advise that it has given the same due and careful consideration and commend him for his advanced thought in the general lines of our industry, particularly with reference to the unprincipled attacks upon invested interests by alleged gas pirates.

It also commends to the attention of the body as a whole the matter of working upon such legislation as will procure for our State the benefits of a rate commission such as is in vogue in other territories.

In the matter of the proposed amendment to the Constitution of our State. This is a matter which we believe should not receive any commendation or criticism from this body, the matter in question being of

purely local concern to each of the companies represented. We feel that the Association cannot as a whole indorse the measure.

E. C. Jones,
John Clement,
L. P. Lowe,
John A. Britton, } Committee.

On motion, the report was adopted, and the President said: I think gentlemen, it would be well to make some recommendation concerning a permanent committee to determine that our State Constitution is amended in the matter causing the creation of a commission to fix rates. I think it would be a very wise thing for this Association to appoint a permanent committee thereon. I think if Mr. Britton were made Chairman of such a committee, with the power to call on any other members of the Association to assist him, it would be a good thing to commence with.

On motion a resolution to such effect was adopted.

The President called for the

REPORT OF COMMITTEE ON NOMINATIONS,

which was submitted by Mr. H. M. Papst, as follows:

We, a Committee on Nomination for Officers for the Association in the coming year, would recommend as follows:

For President—Geo. S. Colquhoun.
For Vice-President—Wm. F. Boardman.
For Secretary—John A. Britton.
For Asst. Secretary—Henry A. Bostwick.
For Directors—Wm. Baurhyte, E. L. Hall, Frank A. Leach, Jr., C. F. Stamps.

Respectfully submitted,
H. M. Papst,
Henry E. Adams,
C. A. Luckenbach, } Committee.

On motion the report of the Committee was adopted, and the gentlemen named to serve as officers for the ensuing year were declared elected.

Mr. Jones—May I be permitted at this time to take it upon myself to thank you for electing Mr. Colquhoun as President of our Association. I presume all of you do not know how ill Mr. Colquhoun has been. Some months ago he was taken seriously ill and his life was despaired of, but I trust that he is now well on the road to recovery. I move, Mr. President, that the Secretary be requested to send a telegram to Mr. Colquhoun, at the St. Francis Hospital, San Francisco, advising him of his election and conveying the good feeling of the members present and the Association toward him. [Motion carried and unanimously adopted.]

TELEGRAM TO MR. COLQUHOUN.

The text of the telegram sent to Mr. Colquhoun was as follows:

SANTA CRUZ, CAL., Sept. 16, 1908.

GEO. S. COLQUHOUN, St. Francis Hospital, San Francisco: The Pacific Coast Gas Association, convened in 16th annual convention, congratulates itself on your election unanimously to the position of President, and sincerely prays for your immediate restoration to health, and promises for you in 1909 the most successful of all meetings under your administration. JOHN A. BRITTON, Sec'y.

The President—Next in order is the reading of the paper by Mr. E. C. Hall, on

PURIFICATION PROBLEMS.

[For the text of the Hall paper, see JOURNAL, *ante*, p. 539.]

Discussion.

The President—Mr. Papst, will you make some remarks concerning this very interesting paper?

Mr. Papst—Mr. President and fellow members: Every gas man is seeking to identify himself with a good, pure gas, which is more important than lowering the combined costs of manufacture, distribution and administration, resulting not only in increased sales and reducing the expense in the appliance and maintenance department, but also in popularity with the public. Nothing reduces gas sales more than the smell from gas, laden with organic sulphur, when it is consumed in an appliance and the products of combustion are allowed to escape in a closed room. The ideal gas for illumination should be free of sulphur compounds. I have here a few references, which I would like to quote, which are translations from the German.

Remarks[1] *by Dr. A. Samtleben.*—"Sulphur limit in Germany 26 to 30½ grains per 100 cubic feet. Gas made from Westphalia mixed with Yorkshire coals showed 46.3 grains of sulphur after purification from sulphuretted hydrogen. Copper gas fittings, especially the smoke protectors, show signs of corrosion, and a greenish efflorescence of basic copper sulphate appeared on them. In one place where a large gas stove was used without a flue, complaints were made of a so-called choking smell. There was no sulphuretted hygrogen in the gas as distributed, so it was decided to make determinations of the amount of sulphur present as carbon bisulphide and organic sulphur compounds. Referring to Prof. Bunte in this same paper, he says: "Bunte has pointed out that the products of combustion of gas containing sulphur attack the metal parts of gas stove and fixtures. The gas industry is under obligations to produce as pure a product as possible, and while washing and other processes for the removal of a quantity of as much as 43½ grains of sulphur per 100 cubic feet (which is equal to only 0.035 per cent. of carbon bisulphide by volume) appears out of the question for the time being, there remains the plan of so selecting coal that the sulphur in the purified gas is as little as possible. Exhaustive working trials, however, are necessary if this plan is adopted, because erroneous conclusions may be drawn if the amount of sulphur in the coal is taken as the sole guide."

Removal of Sulphur Restrictions Bill.[1]

Conference of London Authorities.—Dr. Ashley said furniture and leather in rooms acted upon by sulphur acids. No gas stove, if restrictions should be removed, should be allowed to be fixed in a house unless under a chimney.

Returns of London Gas Testings.[2]—"Coal gas, South Metropolitan Gas Company, 46–84; Commercial Gas Company, 62–57; increased from 36–46 to above since penalties reduced. In any case it would be unsafe for a gas manufacturing concern making coal gas only to set out to supply gas always containing less than 50 grains of sulphur per 100 cubic feet on the average of a month's working, or say 100 grains as a maximum on individual testings, unless prepared to revert to the use of sulphide of lime in the purifiers."

Heat Buildings with Gas.[3]—"Three grains of organic sulphur in 5 cubic feet of gas."

Prosecution of Tottenham Gas Company for Exceeding Restrictions.[4]—"Mr. N. H. Humphrys contended that, as laid down by Parliament itself, lime purifications caused a nuisance and were of no advantage to the consumers."

Prof. Lewes (Witness).—"Nuisance to a locality by the process of lime purification was greater than the sulphur left in the gas could be."

By Mr. H. L. Greville.[5]—"I have no hesitation in saying that, in the old days of flat flame burners, the consumption of an amount of gas to afford a fair light in a decent sized room, would, if the gas contained 80 grains, render the atmosphere unbearable. With gas stoves, where the proportion of sulphur in the gas has been excessive, the smell from the combustion products has been painfully noticeable."

Removal of Sulphur Restrictions Bill.[6]—"Protest by Hastings' corporation against bill stating: Products of combustion of gas containing large proportions of sulphur compounds are prejudicial to health and comfort, particularly amongst persons suffering from chronic affections of the throat and lungs."

Protests were also offered by Hanley Town Council, Shrewsbury Town Council and East Molesey District Council.

Mr. Papst—The reheating process has been evolved by our staff, which, at first as a mere laboratory experiment, as explained by Mr. Hall, has been worked on a commercial scale, and it operates with absolute certainty. The apparatus can be adopted for either solid or liquid fuel to heat the brickwork. The cost of operating this apparatus depends on local conditions, capacity of the works and cost of fuel or cost of heating material. In our case the plant will handle 5,000,000 cubic feet of gas per day with ½ gallon of oil per 1,000 cubic feet, reheated, for fuel, requiring 3 men, working on 8-hour shifts. Gas companies making coal gas, and fitted with this process as an adjunct to their purifying plant, can now purchase gas making coal of high sulphur content without fear of sending out gas with organic sulphur; moreover, producing gas in the holder at a greatly reduced cost. I will be glad to answer any questions.

Mr. Lowe—I would like to ask what does Mr. Papst mean by "Three men, 8-hour shifts?"

Mr. Papst—Three men for entire 24 hours.

The President—Several things occur to me. I notice you give the cost of this extra fuel. Admitting that the average cost of oil, say, is 84 cents per barrel, that would be about 1 cent per 1,000. Would that

1. *Journal of Gas Lighting.*
2. *Journal of Gas Lighting.*
3. *Gas World.*
4. *Gas World.*
5. *Journal of Gas Lighting.*
6. *Gas World.*

not seem an excessive cost. Cost of installation is considerable, is it not?

Mr. Papst—Cost of plant is deemed an extra. Our plant cost $9,000, and the brickwork about $3,000, or a total of $12,000.

The President—For a million feet per day?

Mr. Papst—We are passing now about 3 millions through that generator. This winter we will have about 5 millions, which is the capacity of the machine.

The President—That cost is not very great; is it?

Mr. Papst—Cost will be eventually less.

The President—I think the cost in California, by using oil, free from sulphur, is a trifle higher, but accomplishes the same thing.

Mr. Papst—I believe the final cost will be lower, because this plant can also be used for solid fuel. It is arranged in such a way that you can change over to lampblack, or the by-product of oil gas manufacture.

Mr. Jones—We have had a similar experience to that of Mr. Hall in handling some of the California oils containing a large percentage of sulphur and, instead of adopting his plan of roasting the gas, we "roast" the oil company. We were using a distillate from one of the fields which contained in 1 barrel as much sulphur as formerly existed in 2 or 3 barrels of crude oil, and in changing our oil we specified crude oil with less sulphur. Of course, we do not pretend to take out carbon disulphide with the oxide of iron, but we do remove all of the sulphuretted hydrogen. We have had so much trouble that we are becoming familiar with it, and our gas is getting the best purification obtainable by the use of oxide of iron. I also agree with Prof. Lowe that lime purification for gas is really the only way to treat the gas, and gas so purified is really the best gas to be used; but the cost makes it prohibitive. Mr. Hall speaks of reheating after purifying, and as I am entirely ignorant of this method of treating gas, I would like to ask what the difference would be between adding a secondary set after purification with the use of extra fuel to raise the temperature, and adding a third shell to the set, and making use of the waste heat from the primary set? Another matter mentioned by Mr. Hall is the presence of cyanides in oil gas. This is a new idea. We have always considered there is no cyanogen in oil gas. Cyanides for treating refractory ores have been obtained from the purification of coal gas, but we failed to discover them in oil gas until recently. I have recently suspected the presence of hydrocyanic acid in small quantities, but not enough to make it dangerous in any way, and if any should go forward with the gas, it would be consumed at the burner without any deleterious effects on the air of rooms. It is interesting to guess—we will have to say guess—where this hydrocyanic acid comes from. In looking over different authorities, I find that Berthelot, the celebrated French chemist, discovered that passing electric sparks through a mixture of acetylene gas and hydrogen produced hydrocyanic acid. We have that condition of affairs in an oil gas generator, that is highly heated for just a moment of time when the blast is taken off and the generator is full of products of combustion. Instant formation of hydrocyanic acid occurs from the oil in contact with small particles of overheated firebrick, possibly at a higher temperature than we imagine exists in our generators. Now, in passing forward with the gas to the purifiers, I find that, in the presence of an excess of sulphuretted hydrogen, hydrocyanic acid does not unite with the oxide of iron, but, after the first or second purifier has performed its work of taking out this large amount of sulphuretted hydrogen, then the hydrocyanic acid combines with the iron oxide, forming a ferrousferric cyanide, and we notice in oxide of iron in very small quantities this ferrousferric cyanide, and also have detected the very well known color of Prussian blue. That is all very well in low pressure gas, but when we take this same gas and pass it through a compressor, changing the physical conditions to such an extent that we throw down substances in it that otherwise would be taken care of in the saturated gas. We meet a fine dust in our drips and high pressure pipes that is extremely disagreeable. We have found in two of our lines, particularly that in Sacramento, and the line to Redwood City, from Martin Station, a fine, black dust, which we would like to believe is lampblack; but as a matter of fact, there is not a trace of lampblack in it. It consists of small particles of dust from the purifying material carried forward, and also metallic sulphur. Mr. Lowe some time ago brought up the matter of finding metallic sulphur (that is, sulphur in its elementary condition, as you take it out of the ground) in his high pressure mains at Palo Alto, and I believe I was the one who said such a state of affairs could not exist, and it was through ignorance that I said it. In conversation with Prof. O'Neil, of the University of California, he stated that there are things in oil gas that we do not know anything about, and I agree with him. I have found metallic sulphur in our high pressure mains as described by Mr. Lowe. It looks the yellow color, because it is stained with foreign substances; but, notwithstanding its color, it is sulphur mixed with these cyanides of iron. Regarding reheating, I would like to ask Mr. Hall if we cannot make use of some of the waste heat from our present sets in reheating immediately by the use of the third shell and thereby save the heating fuel as well as the second set of purifiers?

Mr. Hall—Replying to Mr. Jones I would say we thought of using a design of reheaters to save all the heats, but have not yet worked out the detail. I have been asked as to the cause of the removal of sulphur by this reheating method. I would like to say thereon, that, if the chemistry of the method is thoroughly understood, it will at once be seen that the presence of lampblack and sulphuretted hydrogen in the generator will cause the formation of this organic matter. There is a reaction going on which is first one way then the other.

The President—What is the minimum sulphur amount remaining after purification?

Mr. Papst—Only a trace.

The President—Twenty grains is allowed in England and most of the Eastern States.

Mr. Papst—Yes.

The President—This is not offensive to the customer.

Mr. Papst—It would be noticeable in a closed room in time.

The President—For ordinary commercial purposes?

Mr. Papst—It is bound to be noticeable in time to come.

Mr. Jones—Does Mr. Papst find his ultimate test of sulphur compounds by the Referee's test?

Mr. Papst—The final test is made by the German method, which is considered the most accurate. We never use the Tutweiler test, because it is very lacking.

Mr. Jones—Only for sulphuretted hydrogen?

Mr. Papst—Yes, sir.

Mr. Foster—I am interested in the paper that Mr. Hall read; also the question Mr. Jones brought up about the use of the third shell, that it would not be necessary to reheat the purified gas. It seems to me possible to heat a third shell in the ordinary process of heating. The gas could be returned in a purified state to that third shell and still gain the waste heat from the operation. Was that ever tried, Mr. Hall, or do you think it would be a feasible proposition?

Mr. Hall—I did not catch all the remarks. I understand, though, the question referred to the back-action that takes place in reheated gas.

Mr. Foster—Mr. Jones suggested, I believe, if I understand him correctly, that the gas, after it passed from the superheater would go through a third shell and be reheated before purification. I said that, in the initial operations of an oil gas machine, it would be possible to heat a third shell with the waste heat of ordinary manufacture, then send the gas through the purifiers and return it to the third shell before passing it to final purification, thus saving an additional set. Is that a possibility?

Mr. Hall—Of course, any reheating that could be done on the machine itself would tend to economy. As to the advisability of such a procedure, I would be very strongly against anything like that, because the maintenance of the proper heats in two different shells might not be a feasible thing. Again to re-heat a third shell would take a great deal more oil. The piping of purified gas over to the generator would involve a very complicated piece of apparatus with extremely dangerous possibilities, and I do not think that the complication would be advisable.

Mr. Foster—Will the re-heating of the gas change the composition of the gas any, Mr. Hall?

Mr. Hall—The re-heated gas analyzed about the same before and after; that is to say, as far as the analysis is concerned, when it comes down to such a small volume of percentages as carbon bisulphide, which is only three-hundredths of a per cent., it would seem to be out of the question to trace the real analytical changes taking place.

Mr. Britton—The conditions existing at Portland, Ore., are somewhat different than with us on the Coast. We have had all of the experiences they have had. I fancy in Portland that they get what we were struggling with for some time, the distillate of the Union Oil Company; that is, oil with the tops taken off and an oil of about 22° or 23° gravity, and probably containing from 2½ to 3 per cent. of sulphur. It has occurred to me to ask one or two questions with reference to this matter, mainly as to the secondary purification.

The organic sulphur, as I understand it, is broken down. What reaction, if any, takes place? What is noticeable in the oxides in your second purification, and do you require the same area of purification for the gas as you do before? Is the same quantity of oxide used in your secondary purification as in your primary purification.

Mr. Papst—Considerably less. Formation of sulphur in our purified gas, say, 520 grains. We have 480 grains of sulphuretted hydrogen and 60 grains of organic sulphur, which is practically the proportion of 7 to 8½. The total sulphuretted hydrogen is removed, so that if we reheat we are bound to have the same proportion. Therefore, if we have 60 grains we can take it down to 5 grains. That is the theory Mr. Hall worked out.

Mr. Britton—At what velocity do you take the gas through your reheating apparatus?

Mr. Papst—The ordinary pressure of our exhausters. It enters the purifiers at a secondary temperature of about 100°.

Mr. Lowe—That is to say, you have cooling processes for your secondary step?

Mr. Papst—Yes, sir.

Mr. Lowe—Possibly it would make it a little clearer if Mr. Papst would explain his purifying sets. Of what does the first set consist?

Mr. Papst—Four large boxes.

Mr. Lowe—After you pass through your reheating process, you pass the gas through what?

Mr. Papst—Other purifying boxes.

Mr. Britton—Do you use any lime at all in your primary or secondary boxes?

Mr. Papst—None.

Mr. Lowe—Do you completely remove your sulphuretted hydrogen in your first purifiers?

Mr. Papst—Completely.

Mr. Hall—As to the cooling of the gas, I would like to say, because of the removal of tar, moisture, lampblack, etc., the gas is very much more easily heated up and cooled; in other words, the specific heat is very much less. As to secondary purifiers, of course, it is regarded by every gas man that we do not get everything out by our oxides; now that oxide is quite sufficient for the secondary purifiers. In other words, we do not have to make oxide for secondary purifiers, the old stuff is considered good enough.

Mr. Van der Naillon—I should like to ask in the purification of gas, if they have ever used lime in liquid form heated to high temperature for the absorption of sulphur.

Mr. Lowe—What do you call a "high temperature?"

Mr. Van der Naillon—Perhaps a little lower than 212° F.

Mr. Lowe—Not to my knowledge.

Mr. Jones—The best purification known is the milk-of-lime purification. Back in 1825, in Boston, they used milk-of-lime purifiers. It was found that you could purify as much as 14,000 cubic feet of gas per bushel of slaked lime, as against about 6,000 cubic feet in the form in which we used it in our dry lime purifiers. There was an efficiency of almost 2½ times greater. It was found impossible to dispose of the refuse from milk-of-lime. It was given the name "Blue Billy." It is a most offensive substance. The authorities would not allow it to be dumped into the waters of the Bay or rivers, and it is practically impossible to dispose of it. It contains too much water to permit of evaporation and reburning in a lime kiln, which has been tried and which is very expensive, so we had to abandon it, although we realized it has an efficiency of over 2½ times as great as ordinary calcium hydrate.

The President—Does it take out the sulphur?

Mr. Jones—The sulphur and the carbonic acid, so that your gas is absolutely free from impurities.

Mr. John A. Britton read his paper on

CORPORATION REGULATION.

[For the text of the paper, see JOURNAL, *ante*, p. 666.]

The President—Gentlemen, you have heard this very interesting paper by Mr. Britton. I hope you will not forget it. Mr. Britton has already been appointed Chairman of a Committee to look this matter up, and you will probably hear from him from time-to-time. The next paper on the programme is entitled

THE STORY OF CARBON IN OIL GAS MANUFACTURE,

by Mr. F. C. Millard. As the author is not present I will ask the Secretary to read it.

[For the text of the Millard paper, see JOURNAL, *ante*, p. 578.]

The President—As it seems there is no one desirous to ask any questions in respect of this paper, I will ask Mr. W. H. Foster to narrate his story of

THE HUMOROUS SIDE OF A GAS MAN'S LIFE.

[For the text of the Foster paper, see JOURNAL, *ante*, p. 538.]

Discussion.

The President—All of us at various times have had experiences like those which Mr. Foster relates. My first experience in the gas business was at a counter of the agency of the Pacific Gas improvement Company, 25 years ago, at which time the price of gas was $1.50 per 1,000. We were in competition with the old San Francisco Gas Light Company, and everything was very nice, but when the rate went up to $2.25 per 1,000 we had a great many calls like those noted by Mr. Foster. In fact, I recollect many of them now.

Mr. Lowe—I would like to ask Mr. Foster if he is familiar with the so-called "complaint meter."

Mr. Foster—No, sir; I do not think I am.

Mr. Lowe—The "complaint meter" is a very ingenious device and very helpful in the case of people who claim they use no gas. It embodies a device that records upon a chart the hours of the day, the time at which the gas is used and the flow at the particular moment of consumption. By reading the chart for a few days and becoming acquainted with the customs and habits of any complaining consumer, it is possible to "spring" his record on him, which will be found very helpful indeed. After one such experience you will have no further trouble with the consumer.

(To be Continued.)

[CONTINUED FROM PAGE 806.]

PROCEEDINGS, SEVENTEENTH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION.

HELD IN KALAMAZOO, MICH., SEPTEMBER 23D TO 25TH, 1908.

FIRST DAY—MORNING SESSION.

Discussion on the paper by Mr. W. M. Blinks.

The President—Gentlemen, there is an opportunity for a wide range of discussion here, and it is up to you to defend yourselves. I would like Mr. Lynn to open the discussion.

Mr. Lynn—Mr. President and Gentlemen of the Association: I I don't know that I wish to stand here and defend all of you. However, I am one of you and I am willing to do my share. I think one paragraph of the paper that is misleading is in regard to the natural gas situation in Pittsburgh. The Consolidated Company, in Pittsburgh, controls the natural gas situation there, and the price of natural gas for fuel as well, and the use of natural gas in every way possible for light is discouraged. They went so far two years ago, when a Pittsburgh man had a gas meter set for fuel use, but who also used it for lights, to carry the case into the Supreme Court. There it was decided, of course, against the Gas Company and in favor of the consumer. The Court held that after the gas passed the meter it was the man's property and he could spout it out in his backyard if he wanted to, or use it for light or fuel or anything else that he wished. Regarding associate members being active members of our Gas Associations, I do not think that, while there is some merit in his argument, the point is over well taken. The gas men meet as a rule to exchange in the discussion of the manufacture and distribution of gas. We all know we have a great many bright men in the supply business, and, like every other business, probably some of those gentlemen who are selling appliances in different parts of the country for different purposes would make better gas men than some men who are in the business; but at the same time I think, when a Gas Light Association holds a meeting its proceedings should be limited to men active in the gas business, not to supply men, who are supplying appliances for using the same.

The President—I would like to hear from Mr. Thompson on that proposition.

Mr. Thompson—I would have said something different from what Mr. Lynn did if I had been called in the beginning; but I don't feel much like saying anything now. I have learned something by this Association. Being connected more or less with the advertising fraternity than in any other way I cannot help talking with those men. I have to seek the best men I can get among the advertisers because I am one of the fellows who pay some of the bills. I think though that there should be some closer association between the active and associate members of any Association. There is always one class of men, members of the same Association, who seem to take a little bit more interest in its affairs than the other men. Now I don't think any of us are too smart about our own business. I think we

can all live and learn something. I spend a good deal of money trying to learn something all of the time. I attended a Convention, in Kansas City about a month ago, of the National Advertising Association. There were only two of us in that convention who were advertisers, the others being fellows like me who paid the bills and who could not have gotten there any other way. I brought that matter up there and we had a good talk about it, and we thought there should be a better feeling between the associate and the active members. Mr. Lynn made a very good point there where men like me might sometimes feel they had a right to come into some meeting and talk about the manufacture of gas, but I know as much about the manufacture of gas (and Mr. Lynn knows it too) as I know about Heaven. [Applause.] I talked with him last night, but I didn't make much out of it. I rather think the point is very well taken, and at the same time I think the fellow who has something to sell while there, may have at the same time get in while some talk is going on about which he is not concerned. There seems to be a good feeling in this Association anyway, and I am satisfied with it as it is. We don't want much, and I am willing to make as much noise as anybody else, but we ought to come together and do something of moment for the good of all, whether as appliance men or as gas men. Are we going to have a discussion of the President's Address some time?

The President—That will come up further along, or after the Committee reports.

Mr. Thompson—I have got something to say, and if you will excuse me I would be obliged to you for the privilege of making some remarks.

Mr. Lynn—I don't want our associate members to think I want to "knock" them in any way, because there has never been in all my experience in attending the Association anything but the kindest feelings between its associate and active members. For myself in particular I can truthfully say that no associate member ever made himself obnoxious in any particular to me or to anybody else that I ever heard of. I like to see them and to exchange ideas and views with them. In fact I find in the exchanging of private views with one another we have been often benefitted just as much as by this meeting or the discussion on the papers. Anybody can get up a paper that can be read before the Association, for every man has his specialty and so, of course, he is better posted on that than probably the next man would be. Don't take from my remarks that I am at all opposed to associate members.

The President—There are several appliance men in the room and we will be glad to hear from any of them.

Mr. Persons—I want to say a word. The cause for having associate members is probably this. In the early days of these Associations general dissatisfaction was aroused by several papers read by supply men on their own wares. That caused a breakup of the old Western Gas Association and from that came the associate members, and it is, I think a very good distinction. It prevents us being active officers. I don't think any of us ever want to be active officers, nor is it permitted us to enter into the politics of the Association. I can have all of the fun and benefits of the convention as well as the active members, and I notice they most always do all of the talking. I have had a little experience with natural gas. In Cleveland the natural gas gave out and the gas company bought the gas, but it was not what it was cracked up to be and there was no competition in it at all; it was all on the other side. They bought the gas at 25 cents per 1,000.

Mr. Lynn—Those who have been selling 25-cent gas will probably find that the natural gas companies throughout the country have not made any great effort to get the lighting. The lighting business has a very small profit to us. It is the electric light companies who make a reasonable profit on it. I am not so stuck on a customer that I want to do something for him that is going to knock a man's business who is making his living out of it. In all our companies we don't push the arc light for natural gas, and these arc light men well know there are sales of gas arc lights to natural gas companies and know that we have not pushed them for lighting business. Their bills amount to 50 to 75 cents a month while the electric light companies run to $4 or $5. I believe the general feeling of natural gas men throughout the country is they don't want to interfere with the lighting. The cheap 25-cent gas is poor, and we push our business in that direction constantly. That probably sounds a little peculiar for a gas man to state that he doesn't push his business because there is not much profit in it, but there is not much profit in taking a small business for a 50-cent bill a month. We have the furnaces and factories and most everything else, and there is not enough in it to pay to push it, but, of course, when the customer wants it and calls for it we have to give it to him.

The President—This paper covers a multitude of subjects. I would like to hear from Mr. Eaton, of Saginaw.

Mr. Eaton—Mr. Lynn surely brought out one point here worth considering. I wish to say, from my experience in Saginaw, where we have both electricity and gas, the competition with gasoline is harder to find than in cities like Jackson where the electric and gas companies are separate. As to people thinking that the manufacturer is holding them up and that what he says is not true, I say that the President's Address might be a little more plainer, and that we should show the people what we do, and that it is not necessary to have the "Keep Out" sign on the gate, that has been referred to, referring to appliance men. I think if they undersood that we must get the necessary means of support and everything be straight, they can enter into the discussions, and they know what we have to meet. Gas men are always willing and anxious to ask them at these meetings for the experience they have had in actual practice, and what they have bumped against traveling from place to place. They not only go over this State but over the entire United States, and it is their knowledge and information—facts that they pick up—that we are always wanting to learn.

The Secretary—From the Treasurer's book I would like to dispute the second paragraph only. The appliance men in Michigan have not been called upon for years for any assistance to the Michigan Gas Association as far as its Scholarship Fund is concerned. The active members take care of that entirely. As far as membership is concerned most of our funds come from active members, not from associate members, and the delinquent list we find much stronger in the associate than in the active class. That is not a criticism upon the gentlemen, however, but it is to get your mind away from the fact that the associate membership of the Michigan Gas Association is not the one that is paying the bills.

The President—Are there any further remarks upon this paper?

Mr. Douglas—I am sorry to gather from Mr. Blinks' paper there was any feeling on the part of the associate members, or that they are not just as much members of the Michigan Gas Association as are the active members. I have never seen a meeting where they were not entirely welcome to speak on any subject. We have had a great many splendid papers from them, and I am very much surprised there is a feeling that they are not absolutely full members of the Association, even if they are not able to vote or to hold offices. These are such small parts I don't think there should be any feeling on account of it.

The Secretary—I simply made the statement that the active members are the ones vitally interested in this work in Ann Arbor, for two years ago it was decided that, inasmuch as it was work directly for them, and they were those ones who got the benefit, they should be the ones to pay the bills, and they have paid them for two years.

The President—It may be plain to everybody that Mr. Ewing refers to the expense of the Scholarship work, which is separate from the running expenses of the Association proper. If there is no further discussion I will ask Mr. Blinks to conclude the discussion.

Mr. Blinks—If I thought all these things applied to the Michigan Association I would not have dared to state them here. I would have left that to somebody else. I was very careful to say this, that I am as good as the associate members. I used to be an active member of the other Association that went into the combination, but under the strict ruling they make there now I went into the associate list. In looking through the list of members I checked off some names whose title to active membership is not anywhere near as strong as it might be; and if they enforce the rule, and if the gas business must be their permanent pursuit in life, they would not belong in there. I don't think probably all the associate members feel just as I do, because, having been on one side of the fence and then on the other side, it has always impressed me that outside of the State Association, where good fellowship is very much in evidence, there is quite a strong line of demarkation between the engineers and dealers. I thought maybe someone would tell just why they have this associate list. I asked a good many of them but they did not answer. Mr. Persons has come nearer to it than anyone else. There are people who will come here to exploit some business. I don't believe in that. I don't believe you should use the Association for such exploitation, but it is being done all the while, which is probably the reason that it came about, and the Michigan Association in all cases is not together anyhow. It was not my idea to criticise it in the least. If I thought it applied

to you I never would have come here and said so. About the natural gas proposition referred to. In Pittsburgh there is competition in natural gas I have always understood. There is no competition to speak of between electricity, manufactured gas and a large part of the natural gas; it is all controlled by one united corporation. I believe the natural gas men know their business a good deal better than I do, and when they don't care to bother about the lighting business that is not a thing I would object to for a minute, but I do object to a man saying there is absolutely no reason to do it if reduction in the price of artificial gas would be of any assistance in holding the business as has been stated. Reference was made that the bulk of the lighting in natural gas towns is done by electricity. This is undoubtedly a fact, and the reason such is the case is that the only people who are competent and likely to maintain their lighting business as it should be are the gas people. They simply don't go and get after it; they rely upon the receipts from gas alone. It always seems where there was competition between gas and electricity the natural gas should sell service rather than gas. Were the consumer willing to pay $3 or $4 for an electric arc instead of using a gas arc, for service equally as good for half-price, and he saved the other half and has paid the gas company not only for the gas but paid them for the service connections and everything else at a good, fair profitable price, that would bring in a revenue amounting to something. The gas sales running 60 cents a month, or something like that, is not something that will drop very much; but the main idea of mentioning the Pittsburgh situation was to show there is a place where it is possible to do artificial gas lighting with gas costing four times the cost of natural gas against all of the other competition. Of course, there are existing reasons that make the situation a little different, but the same thing is being done on a smaller extent in Dayton, Columbus and other Ohio towns, so I would say that is pretty good evidence that the point taken is that the gas people do nothing, that they even could not slip the price of their gas down to 50 cents, if they were to gain on the lighting business; I should seriously object to that statement. About taking care of the expenses. That doesn't refer to the Michigan Association either, but there are a great many expenses which we very cheerfully bear in connection with Association work which are not in the payment of dues and other things. I hope to get a little more light upon the real reasons for active and associate membership which I haven't as yet. We may get it when the technical papers are read. Undoubtedly the address may come with reference to this afterwards when they are in want of information in that line of work; but the only thing that starts a good, lively line of discussion is a talk on business methods and the like. They come a little closer to the case here probably to show the connection more evidently between them and the things we have heard about for 20 years. We start in on that and the associate members would feel a good deal more like talking if they didn't feel possibly that it was not their business to speak at Association meetings.

Mr Lynn—I don't see why anybody should ask the information thus asked for. He having been an active and an associate member of the Association, he has been on both sides of the fence, and should know how it feels and also know why he is there. If I had been there I think I would know why I should have been on both sides. I think the Association that he refers to has a very large number of associate members not any more entitled to be active members than he is. I think that probably is a misunderstanding. I have been a Director of the American Gas Institute for the past 2 years and have attended several meetings. There has never been a meeting of the American Gas Institute where there has not been more or less talk over the associate member list. I don't think there is any convention held in the land that you could not name a person in the meeting who is not entitled to active membership. I will say that the commotion is all over associate membership of the American Gas Institute. There are a good many men in the active membership of the American Gas Institute who are supply men, meter men and others of that character, but which does not entitle them to be active members of that Institute. If the gentleman will inquire he will find that they have interests in gas companies and are either president or vice president or secretary of a gas company, or else hold some official position with the gas companies in every case. I know a man I might refer to who is entitled to active membership in auy Gas Association if any man in the United States is entitled to it, but he is not an active member, I don't believe, in any Association. He has had charge of gas companies and has been a gas engineer all his life, and he has been connected with the gas industry all his life—I don't think any other man in the gas industry is thought more of than he is—yet he doesn't feel that he should be an active member. I think that if anybody should be, there (pointing to Fred. R. Persons) is one man that ought to be recognized by every Gas Association in the country.

The President—If there are no further remarks a vote of thanks will be in order. Mr. Blinks, I extend the thanks of the Association and its officers for this valuable paper. [Applause.]

The President introduced Mr. F. G. Remington, who read a paper on

LABOR SAVING IN MEDIUM-SIZED GAS PLANTS.

In preparing a paper on the above subject for presentation to the Association it has been my intention to present merely a comparison between labor saving devices and hand labor. I am confining this paper to our own plant of 10 benches, as we have taken some steps towards labor saving machinery during the past year. I will endeavor to show in brief form what devices we have installed to save labor and what we have accomplished by so doing.

As it is well known, the prime object of all labor saving devices is to reduce manual labor to the least possible degree, thereby reducing operating expenses and insuring greater freedom from labor troubles. The installation of any device to reduce labor depends largely upon local conditions, and what would be a labor saver in one plant would be a labor maker in another. The first thing I wish to speak of probably will not appeal to the man in charge of a plant already in operation, but to the man in charge of a works in course of erection. That is, an economical arrangement of all apparatus with the view to getting the most work done with the least number of men and also without interfering with plans for future requirements.

For instance, in our own plant, if our ammonia still were in a building adjacent to our boiler room, our fireman could attend to the still and boilers very easily and save about 5 hours' extra labor per day. If our office building and stock room were all in one building, our office clerk could act as stock-keeper and office clerk, thus saving from 3 to 5 hours' labor per day, especially during the summer months.

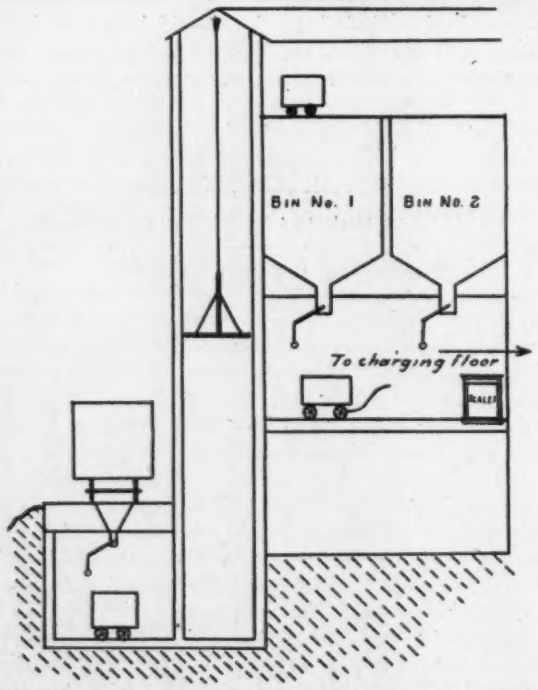
About 2 years ago we were confronted by the coal storage problem, and as our coal storage capacity was very limited, every foot of available ground space being then in use, it became necessary for us to devise some means of increasing our storage capacity on the same dimension of ground space, and we finally decided upon an unloading apparatus and sheds which I will describe briefly.

The apparatus consists of 2 reinforced concrete storage sheds, 2 reinforced concrete, overhead storage bins of 25 tons capacity each, 1 reinforced concrete elevator tower, 1 Otis steam elevator, and Hunt system of industrial railway with side dump car of 2,000 pounds capacity.

The bins and elevator tower are located between the 2 storage sheds and near the center of retort house. There are 4 openings from elevator tower, one leading to an underground pit underneath the railroad siding where coal is unloaded from cars, 1 from tower to runway leading to coke cellar of retort house, 1 from tower to runway leading to retort house charging floor and 1 at top of tower where coal is dumped either into sheds or coal bins. The elevator tower extends to bottom of pit or to a point 8 feet below ground level up to top of shed, the elevator tower being 40 feet 3 inches high. The coal, which is all received in hopper bottom cars, is placed over a small hopper built between the rails. This hopper is fitted with a Hunt cut-off valve, the pocket of coal car being left open until car is empty. The operator does not have to go into car only when the coal becomes clogged and will not feed. The clogging of the coal in car could be remedied by building a larger hopper between rails, and the operator would not have to go above at any time during the unloading of cars.

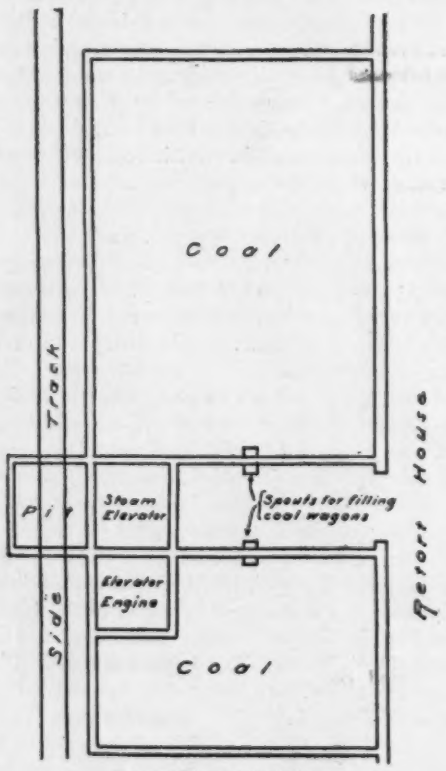
The side-dump car is run into pit under the hopper, where it is filled and run on to elevator to top of shed, and the coal is either dumped into sheds or bins, the bins always being kept full of coal and the surplus coal stored in storage sheds. Openings are left in each shed at ground floor, and in case there are no cars on track the coal is taken from storage and elevated to bins above retort house for immediate use.

Before installing this apparatus, we were compelled to have a man on each 12-hour shift loading coal for retort house, at an expense of 9 cents per ton, and, the bins being large enough to take care of a 24 hours' run, one man fills these bins during the day at a cost of 5 cents per ton, or a saving of 4 cents per ton. The average cost of unloading coal into storage previous to installation amounted to 16 cents per ton, and the cost per ton at the present time is 6 cents, or a saving of 10 cents per ton. By this installation we not only cut down our cost of unloading, but we are able to store 50 per cent.



End Elevation of Coal Shed, Showing Pit, Steam Elevator and Bins.

more coal on the same space of ground owing to the fact that we can store coal at a greater depth. We are also able to handle 50 per cent. more cars per day, lessening the possibilities of car demurrage charges.

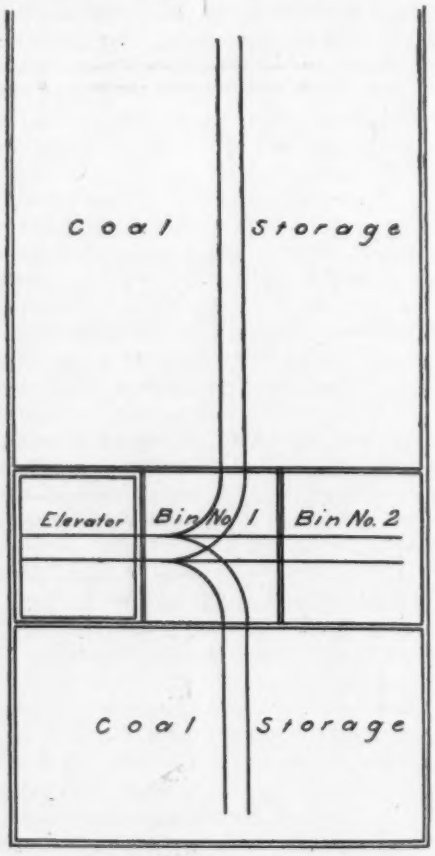


Gr..und Plan of Coal Shed.

The cost of coal pit, bins, elevator tower, elevator and engine, which comprises the coal unloading apparatus, but not the storage sheds, was approximately $4,000. Allowing 10 per cent. for interest, depreciation and repairs, we have a net saving of $680 per year. The cost of this installation at our plant was higher than it would ordinarily be, owing to the fact that we struck water at a depth of 5 feet and were compelled to put our pit underneath track below the water line. Where the railroad siding can be elevated to get plenty of head room in pit without going below ground level, as is the case in Ann Arbor, an installation of this kind can be installed much cheaper.

Our next step towards the reduction of labor was the installation of a discharging machine for the removal of coke from the retorts, but as the machine was only in operation for a short time, owing to the failure of an experimental pump-cushion which we tried, we are unable to give any definite information as to the results to be obtained from the continued use of the machine.

The outfit consists of a 1-rake hydraulic, discharging machine designed by the Fred Bredel Company, of Milwaukee, an especially designed hydraulic high pressure pump, and 2 high pressure compression tanks filled with air tight rubber balls to act as a cushion for the machine and to relieve the pump of the vibration attendant upon running the machine. The rake is operated by water under a pressure of 450 pounds per square inch. The lateral movement of the

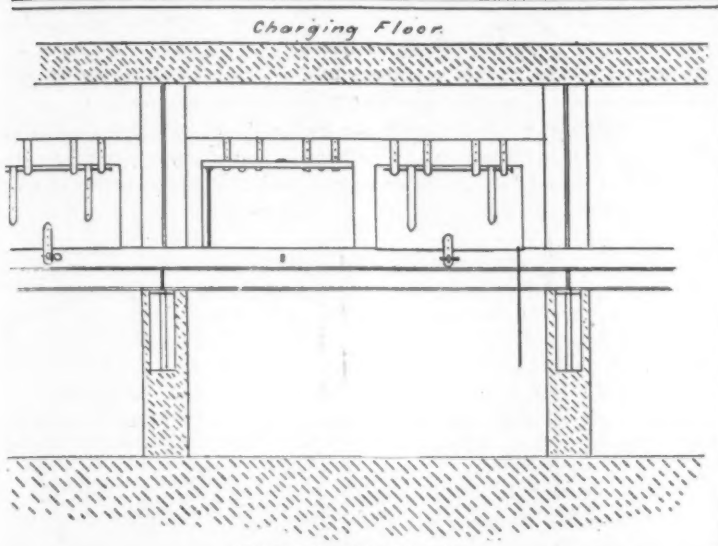


Elevated Track Level.

machine around the track is by a hand crank geared with gear wheels. The pump cushion, which consists of 2 tanks filled with rubber balls, was an experiment and did not prove satisfactory, owing to the fact that the balls would not stand the excessive pressure, and after a few days' use became flattened and were unable to obtain any compression. We have now placed an order for an accumulator to take the place of the compression tanks, and as soon as this is installed I see no reason why the machine should not work to advantage, as the machine proper worked very satisfactorily when we were able to get the pressure. In operating 8 benches entirely by hand labor we required 13 men at a cost of $29.25 per day, or 6.1 cents per 1,000 cubic feet of gas made. When discharging machine is in operation, we can operate 8 benches with 11 men at a cost of $24.75 per day of 5.2 cents per 1,000 cubic feet of gas made, the actual saving being $4.50 per day, or .009 per 1,000.

The cost of this installation was as follows: Drawing machine, $2,100; accumulator, $1,000; pump, $450; connections, $300; compression tanks and rubber balls, $230; tracks, $320; or a total of $4,400. Our annual gross saving was $1,642. Allowing 6 per cent. for interest, 10 per cent. for depreciation and 6 per cent. for repairs, leaves us an annual net saving of $674.

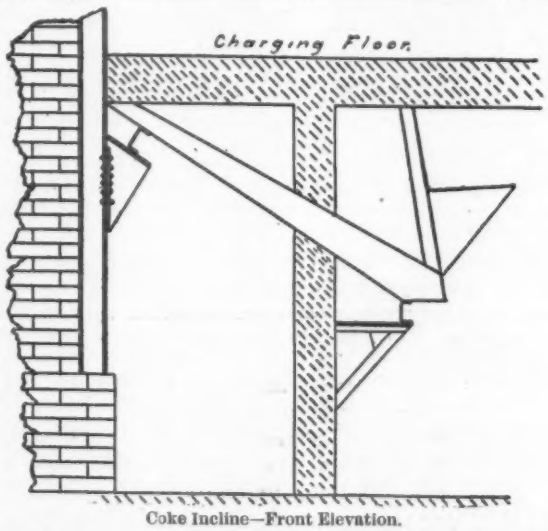
The next installation was a coke incline running the entire length of our 10 benches. This incline consists of tee-irons placed at an angle of 30°, irons being spaced 9-inch centers and paved with firebrick, the brick being covered with concrete 1 inch thick. The ends of the incline are left open, but preparations were made to close ends in case we wish to connect a blower on at any time to take awav the steam caused by the quenching of coke. As the coke is drawn from the retorts it falls through an opening in the charging floor onto the incline, the incline being large enough in front of each bench to allow the coke to spread out and not pile up. The coke is quenched and is allowed to stand until the excess water is drained away, then it is raked off of incline into coke buggy and elevated and dumped over screens and sized. This installation has not materially lessened our labor expense on coke but we are contemplating the installation of a Hunt Industrial Railway to use in connection with this. One man



Coke Incline—End Elevation.

can then take the coke from 10 benches where in the past he was kept busy taking coke from 8 benches.

There is not enough labor saved to warrant an investment of this kind as far as saving in labor is concerned, but taking into consideration that the handling of coke is very disagreeable for any workman, owing to the steam and water that he has to contend with,



Coke Incline—Front Elevation.

it is policy for any company to make such work as pleasant as possible, and you will be able to get a better class of workmen, men who will appreciate the position and stay longer in the employ of the company.

An installation of this kind for 10 benches, including incline iron work, brick and cement, costs approximately $1,300. Track and coke cars will cost approximately $600, or a total of $1,900. We estimate the saving in labor by reason of track and coke cars at about 50 cents per day, or $182.50 per year, which, less 10 per cent. on investment of $600, would give a net saving of $122.50 annually.

There are other features than labor saving in favor of the incline, one of which is the quality of coke made. The coke, being spread out over a larger surface, does not require as much water in quenching, consequently half of the coke is not water soaked and the other half partially quenched. When coke is quenched in this manner there is also less liability of fire in coke pile. We formerly pulled our coke directly from the retorts into coke buggies and quenched the coke by overhead water sprays.

Some companies have installed a coke hopper or chute which hangs to the retort charging floor, the chute being fitted with a trapdoor at the outlet. These are made of heavy, sheet-steel, and have a capacity of 3 retorts of coke, requiring 2 chutes for each bench. The cost of this equipment is approximately $100 per bench. While we have had no experience with a chute of this kind, I believe the depreciation would be very heavy owing to the fact that the hot coke would be very apt to warp the steel and the coke would not be so uniformly quenched.

Another installation I wish to mention, and which we have made, is the Dougherty fuel economizer bench, which, although that is not its mission, does save some labor, as it operates continuously without clinker, thereby doing away with the disagreeable job. The operator has less fuel to fire and less ashes to handle. While the saving to the company is small, there is a further saving in labor, to the benefit of the men and the less arduous and pleasanter we can make the duties of retort house employees, the easier it is to make permanent, satisfied men and tends to more uniform operation, which means saving, although hard to figure in dollars and cents.

(To be Continued.)

Fastening Gas Pipes to Cement Bases.

[Prepared for the JOURNAL, by "R."]

Gas engineers and gas pipe fitters have been obliged to introduce some ingenious schemes for fastening pipes and supports to cement walls, ceilings, beams, blocks, floors and uprights. Cement base pieces are met with great frequency now. The introduction of concrete buildings resulted in the application of much cement work in which bolts and gas pipe brackets had to be secured. In the older types of buildings there are sections of woodwork to connect with, and metal grippings' devices can be fastened to these wooden portions very readily. Then, again, in the brick edifice it is possible to secure a support for a line of gas pipe by driving wedges or keys into the mortar between the bricks—it is feasible to do this even in the stone buildings; but when the gas pipe fitter is confronted with a combination of concrete walls, blocks, stands, beams and cornices, all of which are nearly as hard to cut into as metal, he often wonders what he is going to do. Hence the accompanying drawings with suggestions are offered. First of all, it is well to understand that the modern concrete block is too hard to penetrate with ordinary tools under average conditions. You cannot drive a sharp-pointed instrument into the stuff, as you do in the mortar between the bricks.

You must have a few chipping, gouging and drilling tools. Of course, the bored hole is the best, but some men do not like to take

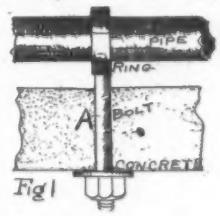


Fig 1

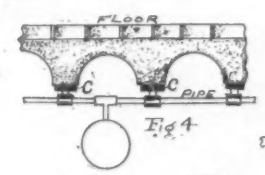


Fig 4

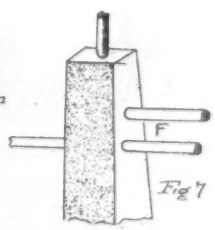


Fig 7

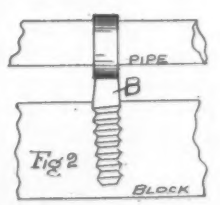


Fig 2

Fig 5

Fig 6

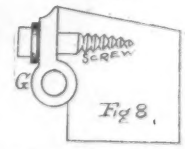


Fig 8.

the time to bore, prefering to make a rougher hole with the cold chisel and machinist's hammer. If you bore, a common machine drill can be used, with brace of the metal boring pattern. The instrument should be properly clamped to the block and the hole drilled same as metal is cut. This will give you a bore like that shown in Fig. 1, in which the wrought iron pipe ring with shaft is fitted and bolted, as at *A*. Or, if you prefer to use the tapper bore-and-ring screw, as in Fig. 2, you need bore the hole only as deep as required to sink the threaded portion of the screw. In case the block is too thick to permit going entirely through it, this is the best way. In order to make the seat for the threads of bolt *B* you should have the proper sized tap in your kit. A regular metal thread tap will do to cut the threads in the cement when the hole is once drilled.

Apartments will be found in the modern concrete house in which even the floor beams are cement and finished accordingly in the rough. The appearance is rustic and attractive. Fig. 4 shows one combination that was installed in a house in which the flooring and the beams of the floor were manufactured of concrete. The line of gas pipe was supported by using some bronze brackets, *c. c.* These brackets were setscrewed to the edges of the concrete floor beams as shown and the gas pipe passed through them.

Sometimes the mode of connection with a block is as shown in Fig. 5. A hole is made in the block, slightly tapering. Then the ring shaft *D*, is driven into the tapering hole. As the shaft also tapers, and as the end spreads a little, the ring shaft is securely held in place. Some of the builders of concrete houses plan ahead of time for the fixing of the pipe stands on the cement. The stands are moulded direct into the blocks as in Fig. 6, at *E*. The brackets calculated for the pipe service are turned over to the concrete block makers and, following the design of the gas engineer's pipe plan, the

brackets of bronze, brass or iron are fitted into the soft cement and clamped before the material is hard. The drying process fastens the bracket securely in position. Sometimes pipes are molded in the columns as shown at *F*, Fig. 7. A convenient little cap-pipe bracket, as secured by a threaded bolt to the concrete, is shown in Fig. 8, at *G*. Adjusted brackets of this kind can be removed if desired and the hole in the concrete closed.

The Bristol Electric Time Recorder.

The Bristol Company, of Waterbury, Conn., in putting on the market its new electric time recorder, appears to have been thoroughly successful in designing an instrument to meet the widespread demand for a simple and practical device to record automatically the occurence and duration of various operations, such as the starting and stopping of machines, the opening and closing of valves, the duration of runs, the passing of trains, etc. With Bristol's electric time recorder it is possible to record several different operations on the same chart, and the recorder may be located a long distance from the points as such operations occur.

The new recorders have already been used in connection with machinery to show when the machines were started and stopped, how long they remained idle, and just when they were started again. Fig. 2 is a reduced cut of a record chart showing complete 24-hour records of the operation of two paper machines. This record shows the time and duration of each break, also the time required to wash the felts and put on new wires.

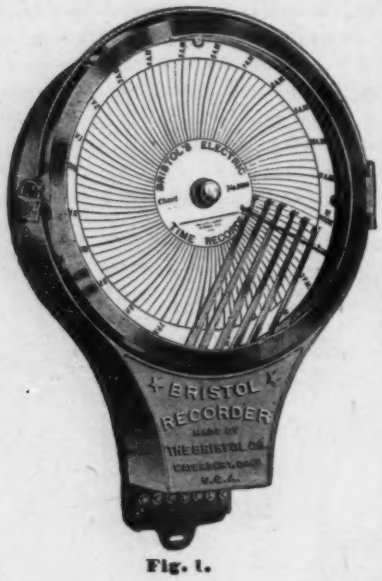


Fig. 1.

One of these recorders, arranged to record operations at 6 different points, is shown on Fig. 1. Each one of the 6 pens shown on this instrument makes an independent record, continuously and automatically, and in this way 6 different operations may be recorded on the same chart. Each pen arm is actuated by an independent electromagnet and battery-circuit, so arranged that closing the circuit causes the pen to move a certain distance on the chart. Binding posts are provided at the base of the recorder, to which pairs of small lead wires are attached. These wires may be of almost any desired length, it only being necessary to have the object whose motion is to be recorded open or close the circuit whenever the motion occurs.

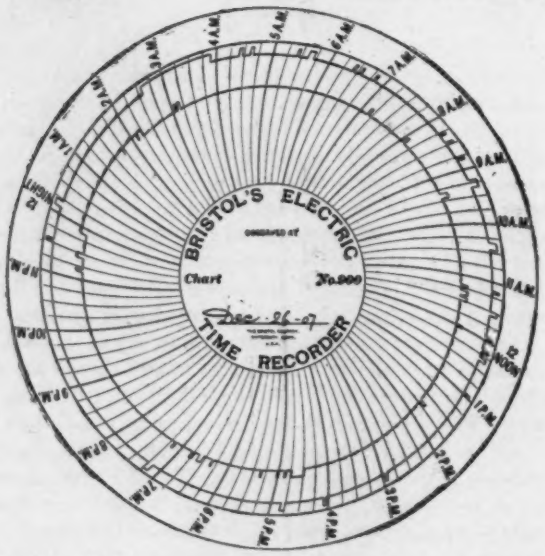


Fig. 2.

The recorders are usually operated by a battery-circuit, but any convenient circuit may be employed by the insertion of lamps or other resistance to reduce the E.M.F. across each electromagnet. The object the motion of which is to be recorded is caused to make and break this circuit through any convenient contact.

Items of Interest
FROM VARIOUS LOCALITIES.

THE Stockbridge Gas Company has petitioned the Massachusetts Board of Gas and Electric Light Commissioners for its approval of an additional issue of stock in the sum of $15,000, the proceeds to be devoted to the taking up of its floating indebtedness.

THE following are the numbers of the bonds drawn by lot, under the terms of the mortgage of the Gas Company of Luzerne County, Pa. The drawing was made the 28th ult., and interest will cease on bonds so drawn 30 days thereafter: Nos. 19, 20, 21, 22, 32, 33, 34, 35, 36, 37, 74, 75, 76, 77, 78, 79, 80, 138, 142, 161, 196, 198, 224, 239, 254, 255, 265, 266, 267, 282, 283, 301, 308, 309, 313, 326, 327, 372, 483, 484, 485, 486, 492, 520, 521, 523, 525, 526, 527, 586, 587, 596, 597, 598, 618, 619, 625, 626, 627, 628, 686. The Wyoming Valley Trust Company, of Wilkes-Barre, Pa., is the Trust Company under the deed.

A VOTE on the proposition of the owners of the Waterloo (Ia.) Gas and Electric Company, to cut the selling rate to $1 per 1,000 cubic feet, if it were allowed under its franchise to manufacture and distribute carburetted water gas, was taken at the general election held in that city the 3d inst. The vote was decidedly in favor of permitting the amendment to be made.

MAYOR EDWARDS, of Elmer, N. J., is no one if not an alms-asker. Some short while ago the Council passed an ordinance under which the Elmer Gas Company was authorized to do business in the named borough. When the document came before Supreme Ruler Edwards he vetoed it, because the Company refused to furnish gas free of charge for the needs of the municipal building.

"F. B.," writing from Chicago, Ills., under date of the 5th inst., says: "It was with surprise that I heard to-day of the resignation of Mr. Horace F. Clark from the travelling staff of the H. Mueller Manufacturing Company. He has taken service with the American Gas Light Company, of Kalamazoo, Mich., and I have been further told that he is interested financially with the Kalamazoo folks. I understand that his successor is a Mr. Cameron, who will have headquarters in Detroit."

MR. JAMES C. DUFFIELD, the Managing Director of the City Gas Company, of London, Ont., is usually up-to-snuff in anything concerning the Company's welfare. Not long ago the residents of a certain dwelling house in that city—respectable people, in fact church members, and of the class who would be horrified at the very suggestion of a visit to the grounds of the Jockey Club on a race day—came under Mr. Duffield's list of suspects; but to prove it or not was the question. "Duff." solved it in this way. One bright morning, say a trifle after 9, a good looking, nattily dressed young woman, touched the button on the front door jamb and asked the maid if she could see the lady of the house. Yes; she could. And she did. Opening her reticule or handbag she took out a neat package which she said contained a working sample of a new cereal that Messrs. So-and-so were putting on the market. Would the mistress like to see the saleslady cook the cereal. "Yes," the lady would. Into the kitchen went the twain. The sample was speedily cooked over a well-regulated opening in a 4-hole range. The visitor further noticed that all the lighting in the house was apparently done by means of electric currents. The mistress was delighted over the teaspoonful or two of the cooked cereal that she ate, obtained the brand name of the goods, and the saleslady departed, having properly expressed her thanks. She returned, however, at noon, accompanied by 2 of the Gas Company's inspectors; also, a detective. She begged off, agreeing to settle any bill for gas that might be sent her. The sealed meter in the house had been cleverly by-passed.

THE proprietors of the Long Beach, Inner Harbor (Cal.) Gas Company have filed a certificate creating a bonded indebtedness amounting to $125,000.

THE Ashtabula (O.) Gas Company has agreed, in consideration of an extension of its franchise, to furnish natural gas at the rate of 39 cents per 1,000, less 3 cents per 1,000 for prompt payment—within 15 days—no account, however, to be less than 50 cents per month. The Company proposes, too, to construct a holder up to retaining 1,000,000 cubic feet, which will guarantee continuous service at controllable pressures.

A RECENT issue of the North Adams (Mass.) *Evening Transcript* declares that plans for the building of a new electric lighting plant have been formulated by Col. Frank S. Richardson and associates for the North Adams Gas Light Company. A corps of engineers have about completed the planning, which calls for a station the maximum output of which is rated at that obtainable from 3,000-horse power.

THE up-State District, New York Public Service Commission, has sanctioned the petition of the Rome Gas, Electric and Power Company, under which it sought to issue $10,000 bonds, the proceeds of which are to go to plant reconstruction.

ACCORDING to the Fourth Annual Report of the Norwich (Conn.) Board of Gas and Electric Commissioners—Messrs. Jno. McWilliams, Wm. F. Bogue and Gilbert S. Raymond—the net profit for the year, after charging off $14,250.38 for depreciation (15 per cent. of the cost of the investment to July 1, 1907) was $26,986.15. According to that the income for the year quite well exceeded $41,000. The salaried officers employed during the year (Wm. F. Bogue, Commissioner and Acting Superintendent, and A. W. Colt, Clerk and Cashier) were paid $1,500 and $1,200 respectively. The number of public lights on the streets (235 arcs and 294 incandescents) cost $23,858.43, including care, maintenance, repairs, current, etc. The cost for lighting the public buildings was: Electricity, $999.40; gas, $99.90. The cost of arc (electric) lamps figured $79.53 each per annum; of incandescents (also electric), $13.85. The lighting table follows an all-night and every night schedule, the total of which foots 3,960 hours. In the gas division these things were done: A new tar well (20 feet by 45 feet, 16 feet deep), was finished; two new benches of 6's were constructed, and ¾ mile distribution main was laid. Service pipe to the length of 2,568 feet was laid—none of this was less than 1-inch in diameter. Meters in use footed up 2,227, an increase of 147 for the twelvemonth. In the electrical service division the new meters placed were in excess of the removals by 140, the total on this account in use being 1,037. The number of electrical users on contract has gone to 14 instead of 65. A thorough inspection of the gas mains and services and of the electric lines and services is underway; and the meters in both divisions are being constantly tested. An accurate map respecting the location of all gas mains is being prepared. The city officials having ignored repeated requests to allow the Board more office room, the Commissioners on their own responsibility hired the main floor and basement of the Alice building for a period of 5 years. In conclusion the Commissioners say: "We again desire to call attention to the suggestion in our last report relative to the necessity for the passage of ordinances covering the use of gas and electricity and the wiring, piping and connections necessary thereto. * * * The improvement in the condition of the plant since the last report is very apparent; but, as was said last year, much still remains to be done in improving the pipe and wire lines. The two gasholders with a capacity of 165,000 cubic feet, are not large enough for a plant of this size, and the time will soon come when it will be necessary to provide a new holder to take care of the growth of the business."

THE Public Service Commission of New York has issued an order directing all gas companies to remove, by July 1, 1909, all gas meters that have been in service for 7 years or more on the day preceding. These meters are all to be retested. Commissioner Maltbie gives it as his opinion that 90,000 meters in use in Greater New York will be affected by this order.

THE Milwaukee (Wis.) Gas Light Company has arranged for the construction of a new building, 60 feet by 220 feet, by 20 feet high, which structure is to be used as a meter repair shop and storeroom.

THE Palmyra (N. Y.) Gas and Electric Company is considering a new rate schedule for its gas division, to be announced before the 1st prox. The Rochester (N.Y.) *State*, in announcing the same, attributes this concession to the fact that Governor Hughes was re-elected. We hope he feels that way on gas matters generally, for it has been said that, if the Supreme Court of the U. S. upholds the decision of the lower courts, in respect of the 80-cent gas law, the Governor proposes to turn his hand to what should be a "fair gas rate" for New York city! Think of that! It is fair, however, to assume that his Public Service creations will be, through their fairness, a sort of brake on his tendencies to go it alone. Of course, everyone knows (that is, everyone not actually in the gas business) that gas can be made in New York city at a cost which should enable its makers to grow rich forthwith on an 80-cent rate. Meanwhile it is well to bear in mind the fate of the fuel gas plant which was to furnish such cheap fuel to the electric plant that was to light Williamsburgh bridge for a figure that was, to say the least, a remarkably low one. Everybody knows the fate of that experiment and the subsequent disposition of the plant. The actual trial thereof lasted 5 months, the cost was something like $80,000 to build and a further $66,000 to demonstrate its worthlessness. Then it was "scrapped," and it stays scrapped.

MR. A. N. SPENCER, Technical Engineer, the Harbison-Walker Refractories Company, of Pittsburgh, Pa., is to be congratulated over the excellence of the matter contained in the booklet prepared by him for the Company in answer to the query, "What are your lime kiln costs?" It is worth a place in your handy reference collection. A line or two to Mr. Spencer will secure it for you.

THE redivivus of the gas division of the Evens & Howard Firebrick Company, of St. Louis, seems to be fraught with activity, for its proprietors inform us that among the orders on its books is a listing for two retort house governors, constructed according to Little's patents. These devices are in the 16-inch class. The regular contracting list includes an order for the resetting of two benches of 6's.

MR. GEORGE S. FOREST and Frank E. Bliss, of Iowa Falls, Ia., assert that the gas works which they propose to construct at Jennings, La., will positively be built this winter. We hope so.

THE Rochester (N. Y.) *Democrat-Chronicle* is our authority for the statement that early in the spring the Rochester Railway and Light Company will commence the erection of a vertical retort equipment in a new house to be located on the low level of ground on the river flats, just to the north of the Vincent street bridge. The construction is to be along the lines of the Dessau system, the working scheme of which was closely studied by General Manager R. M. Searle during his last European trip. The plant will comprise 100 retorts, and the tentative dimensions of the building for their housing are 80 feet by 100 feet by 60 feet.

"DEAR JOURNAL: The liveliest place in Baltimore, Md., the night of November 3d, was around and about and before the handsome office buildings of the Baltimore Gas and Electric Company. There thousands gathered to hear and see the election returns, which, as they came to hand, were clearly shown to the cheering thousands by means of a well actuated stereopticon apparatus. The service was under the intelligent direction of Mr. Nolley.—WADE."

MR. FRANK W. JENNINGS, Superintendent of the Framingham Gas, Fuel and Power Company, of South Framingham, Mass., is also to have general supervision of the Norwood Company. Mr. James A. Hancock will be assistant to Mr. Jennings in his Norwood capacity.

THERE is much voiced objection over the action of the Marlboro-Hudson (Mass.) Gas Company in closing up its Hudson office. President C. W. Morse is responsible for this determination, and it does look to one at this distance from the seat of action that Mr. Morse and his associates are not properly or rightfully being worried for the closing. Those customers who do not wish to pay a visit to the Company's Marlboro office may still pay their bills at the drug store of T. H. Murray, in Hudson. Further, any complaints respecting service, etc., may be left in the drug man's custody.

L. P. LISCOMB, writing to the JOURNAL from Lexington, Ky., under date of the 7th inst., incloses the following: "In the suit of the city against the Louisville Gas Company, to enforce collection of back taxes on stock and bonds held by the defendant in the Louisville Lighting Company, Judge Kirby sustained the findings of the County Court and dismissed the petition. It had been sought to subject the Lighting Company's bonds to taxation, in the amount of $600,000. According to the Court the facts showed that these bonds had already been listed and taxes paid upon them. The stock in the Lighting Company held by the Gas Company was declared to be not subject to taxation, in that the taxes thereon were already paid by the corporation, wherefore, to tax stock in the hands of individual holders would be equivalent to double taxation.

THE terms of the new franchise under which the Canton (O.) Gas Light and Coke Company may continue in business provides that the gross rate shall not exceed $1.10 per 1,000 cubic feet, with a discount of 20 cents per 1,000 therefrom when customers pay their bills on or before the 10th day after having been received. A bond in $5,000 is also required as security to indemnify the city from loss occasioned by any opening of the streets; and it is further stipulated that in the event of the Company, its successors or assigns, determining to hereafter supply natural instead of artificial gas under the franchise, the rates during the period of 10 years shall not exceed the maximum rates charged by any other Companies that may be furnishing natural gas to the city under similar conditions.

THE St. Paul (Minn.) Gas Light Company is moving for the right to distribute steam in that city under a larger plan than that now followed by it.

THE AMERICAN GAS LIGHT JOURNAL

The Market for Gas Securities.

Quotations for Consolidated gas to-day (Friday) are identical with the closing figures of last week—146 to 146¼. The case has been argued before the U. S. Supreme Court and that body has the matter under consideration. It is likely the determination will not be handed down until December. Meanwhile everything connected with the Company and its business points to higher quotations.

Brooklyn Union maintains its balance in the wheel of values, and Peoples, of Chicago, got to par considerably ahead of time we set for it—it sold this morning at par and ¼. The general market is decidedly higher.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

NOVEMBER 16.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$73,177,000	100	146	146¼
Central Union Gas Co.—1st 5's, due 1972, J. & J.	8,000,000	1,000	98	101
Equitable Gas Light Co.—Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	8,500,000	100	130	160
New Amsterdam Gas Co.—1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	102
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
New York and East River—1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—1st 5's, due 1927, J. & J.	1,250,000	1,000	86	91
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	137	140
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	299,650	500	130	—
Out-of Town Companies.				
Bay State	50,000,000	50	2	2½
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,600,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	20,500,000	100	90	90¼
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100¼
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	103	103½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	92	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	—	100
Preferred	2,500,000	100	60	90
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,870,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108½
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	57	57½
Preferred	25,000,000	100	89½	89½
Montreal Gas Co., Canada	9,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	86	88
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,445,000	1,000	96¼	—
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington (D. C.) Gas Co.	2,600,000	20	323¾	327½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	230	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	100	100¼
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—

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City of Boston—Street Department.

To Contractors for Street Lighting and Manufacturers of Street Lighting Apparatus.

The Superintendent of Streets of the city of Boston, 47 City Hall, invites parties having street lighting apparatus adapted to systems other than the present system of low pressure gas mantles to demonstrate, if they so desire, during the continuance of the present contract for street lighting, with a view to the improvement of the present system upon the expiration of the present contract on September 15, 1909.

GUY C. EMERSON,
Boston, Nov. 9, 1908. Superintendent of Streets.
1745-1

Position Wanted
AS HEAD FITTER.

Man 32 years old, 12 years' experience in gas business, inside and outside fitting, fully capable to take charge of inside fitting and main and service work; best of references; any location. Address, "HEAD FITTER,"
1745-1 Care this Journal.

WANTED,
Position as Superintendent or Manager,

By a young married man, with 8 years' practical experience in the manufacture and distribution of both coal and water gas. Address, "J. B.,"
1744-2 Care this Journal.

Position Wanted
As Manager or Superintendent,

By competent gas man, 35 years of age, married, strictly sober, with operating experience both as manager and superintendent in actual charge of plants. A man who can show and give results; 17 years' experience; now acting as manager of coal gas plant in city of 15,000. Will have to give present people 60 days' notice. Address,
1727-eot-tf "RESULTS," care this Journal.

WANTED,
A Position as Superintendent or General Manager

Of a large illuminating or railroad company, or a combination of both. Have had 10 years' experience in the business, and have put several run-down properties on a paying basis. Can furnish the best of references and am willing to go anywhere.
1744 4 Address, "E. A.," care this Journal.

Position Wanted

By successful and competent gas man, with 4 years' experience as superintendent and manager. Thoroughly up to date in all methods of distribution and construction, both high and low pressure systems and water gas manufacture. Has successfully handled 100 men, including jobbers, fitters, appliance men and laborers. Can show results and A-No. 1 references. Address, "XXX,"
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Situation Wanted.

Gas Engineer (30), graduate of German High School, 10 years' experience, thoroughly familiar with installation and construction of gas power and lighting plants, gas benches, holders and all gas apparatus, wants position. Independent worker. First-class references. Address, "H. E.,"
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Position Wanted.

Experience of 15 years, 12 as a manager and superintendent of average sized gas properties, enables the undersigned to qualify as competent in construction, repair and operation of either coal or water gas plant. Correspondence is solicited with owners who have an opening for an energetic and capable man. Has been particularly successful in building up and maintaining good feeling between the public and the operating company. Address, "M.,"
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WANTED,
FIRST-CLASS GAS METER SALESMAN.

State experience and salary.
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Reliable Foreman for a Coal Gas Plant

In city of 75,000. Must be thoroughly familiar with handling of regenerative benches and shovel charging. Address, "Box H.,"
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To take entire charge of a small gas plant. Give age, reference, record to date and salary expected.
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NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 100 in use. Write to
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THE FERY RADIATION PYROMETER

Operates from focussing the heat rays from a hot body on a sensitive Thermo-Couple

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Can be used as close to the hot body as one foot or as far removed as 100 feet.

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As no part of the instrument enters the retort no damage to it can result in use.

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THE FERY In use before a Gas Retort

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American Branch of the Cambridge Scientific Instrument Company, Cambridge, England.

BOOKLET P-4001 Describes the Fery Radiation Pyrometer. Sent on request.

View of Rotary Meter House, Croydon (England) Gas Works.

The Croydon Company first installed (1903) a small Rotary to measure air to purifiers. In 1904 a Rotary of 80,000 cubic feet per hour was set to measure water gas make. This latter machine has been in continuous service since it was installed.

In 1906 Mr. J. W. Helps, Engineer and General Manager of the Croydon Company, in view of the satisfactory service given by the above machines, determined to install two additional Rotaries—one of 180,000 cubic feet per hour and another of 25,000 cubic feet per hour. The above illustrations show the exterior of the house erected to accommodate these meters and the interior of the same. The smaller one takes care of the make when the send-out falls below the minimum of the larger machine.

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One-half the cost—One-tenth the space of old style wet meters.

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VALVES, CONNECTIONS.

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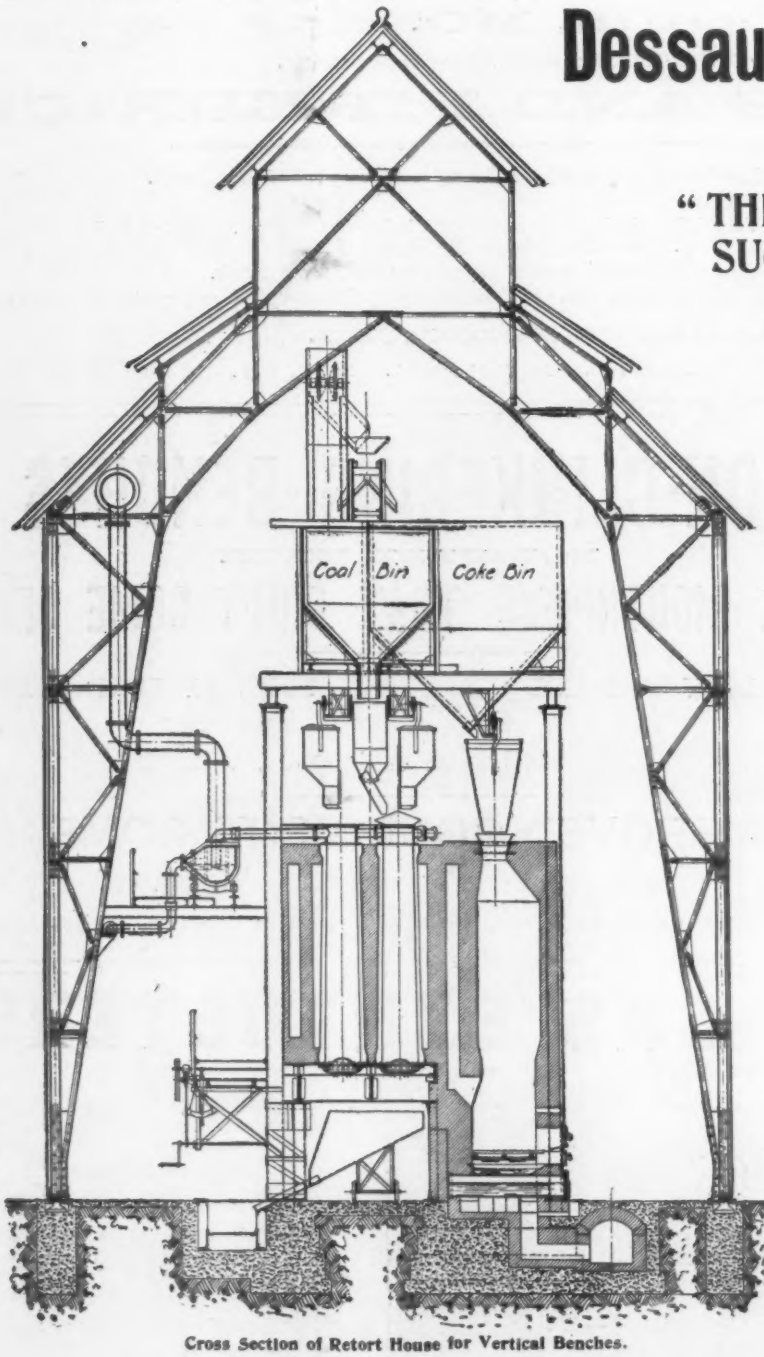

Cross Section of Retort House for Vertical Benches.

Dessau System of Vertical Retorts.

"THE ONLY SYSTEM IN SUCCESSFUL OPERATION."

Nineteen Installations with 126 Benches in operation.

ELEVEN Installations with 96 Benches in course of construction.

Maximum gas produced per man per 24 hours, 360,000 cu. ft.

Ten per cent. increase in yield of gas.

Forty per cent. increase in yield of ammonia.

Best quality of coke.

Least percentage of breeze.

Low fuel consumption.

Tar produced low in carbon.

Extreme low cost of retort house labor.

Minimum expense in wear and tear.

No Naphthaline.

No Cyanogen.

Present Producing Capacity, 25 Million Cu. Ft.

Within **90 days** the above producing capacity has been increased to **31 Million Cubic Feet** by additional orders for **39 benches** with **390 retorts.**

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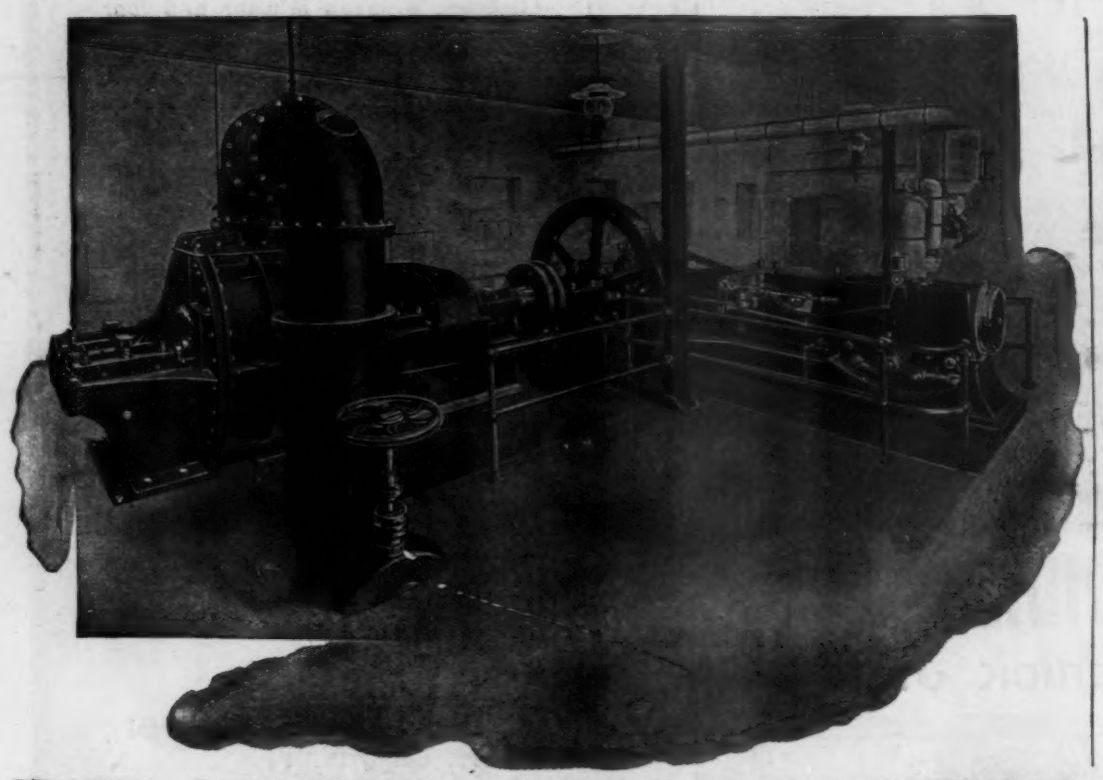
AND HIGH PRESSURE GAS PUMPS.



THIS cut shows one of our High Pressure machines and a 4-valve engine connected by one of our leather link flexible couplings. Two of these units were installed for the Peoples Gas Light and Coke Co., Chicago, at their 73d St. Station. Each machine has a capacity of 14,000,000 cubic feet per day.

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We also manufacture

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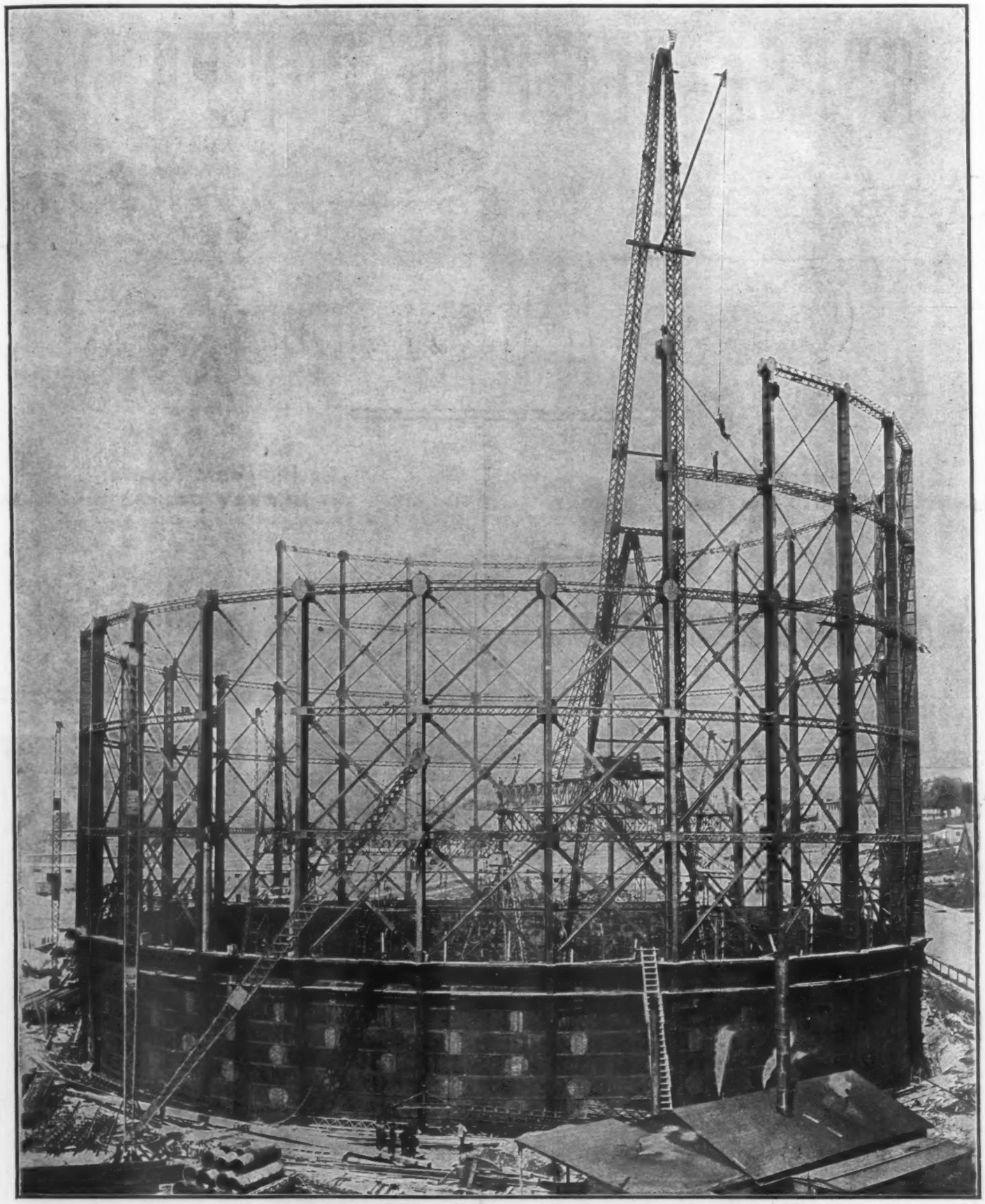

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PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

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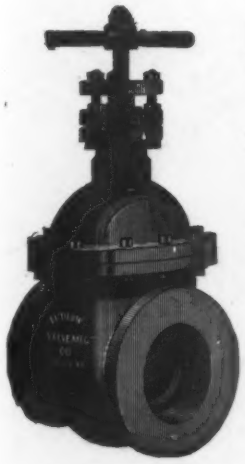

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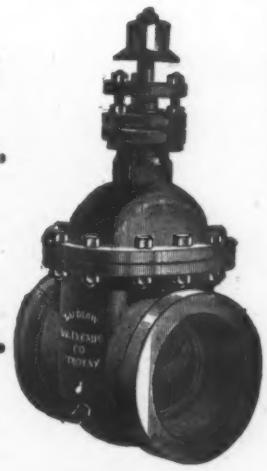

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LATEST DESIGN.

Most Simple and Efficient Machine on the Market. Let us figure on YOUR requirements.

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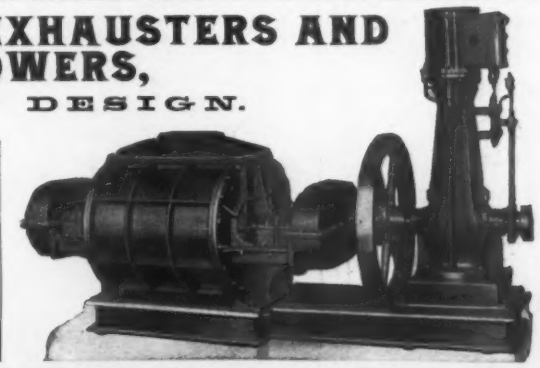

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Every time you clean a choked pipe you waste time and gas, wear out tools and damage the retort. When you clean out a main you lose tar, liquor and gas, and waste time.

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Every time you fail to get all these improvements in your retort stack you waste time in getting perfection.

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COAL TAR AND AMMONIA,

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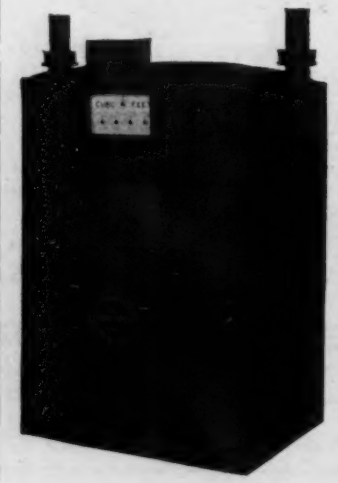
The Westinghouse Type "A" Tin Gas Meter



must not be confused with ordinary gas meters. It is a development retaining all the good features of older types, with improvements greatly adding to its accuracy, measuring capacity and durability.

Our Tin Gas Meter Catalogue No. G-1 contains a well illustrated description. Ask for it.

Type "B" meters if you want them.

Have you heard about our "Ironclad" Dry Gas Meter with cast iron case, for Artificial and Natural Gas?

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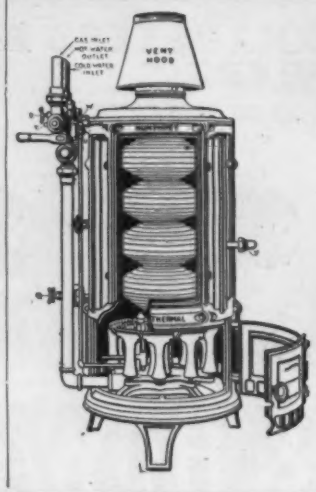

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Have every known desirable feature helping to efficiency, economy, durability and absolute safety.

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PRICES LOW.
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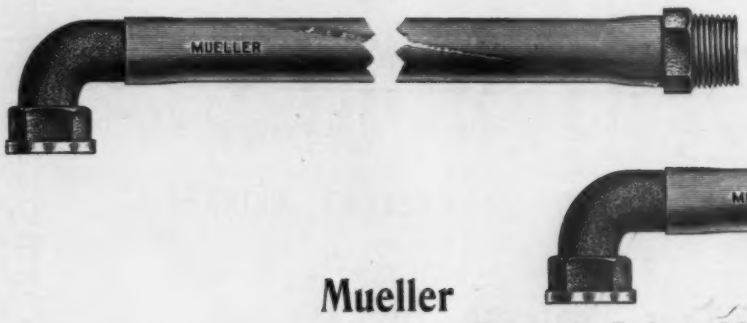

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Mueller Red Brass Fittings, heavily tinned, are sweated into the pipe, and each connection is thoroughly tested.

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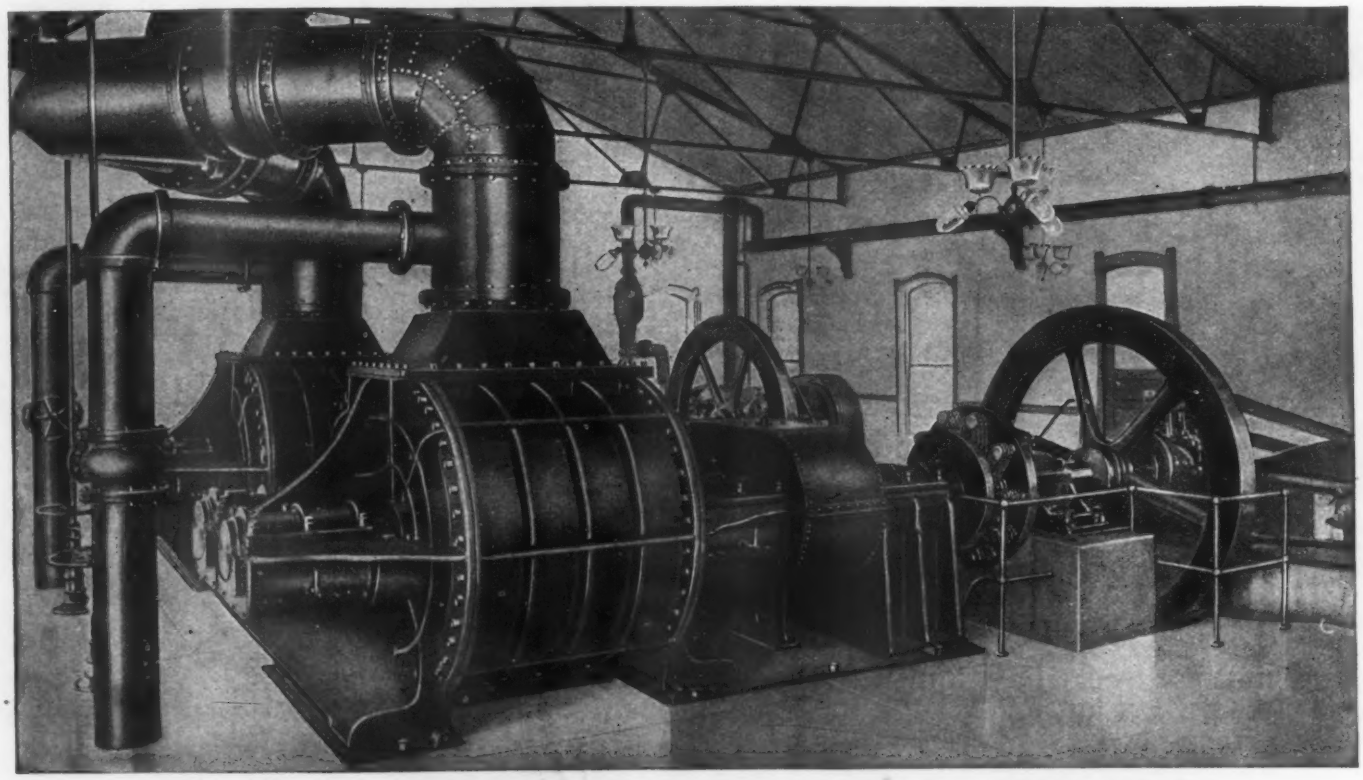

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Adjusted instantly to any pressure. Adjustment is positive and does not affect the energy of the gas.
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AND
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PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME.
By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEORGE M. RICHMOND, M.E. Price, $1.
For Sale by A. M. CALLENDER & CO., 42 Pine St., New York City.

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Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

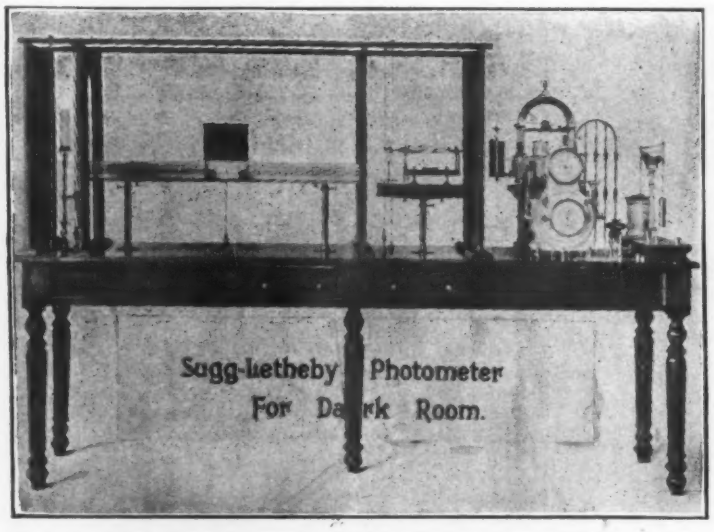
DECEMBER, 1908.

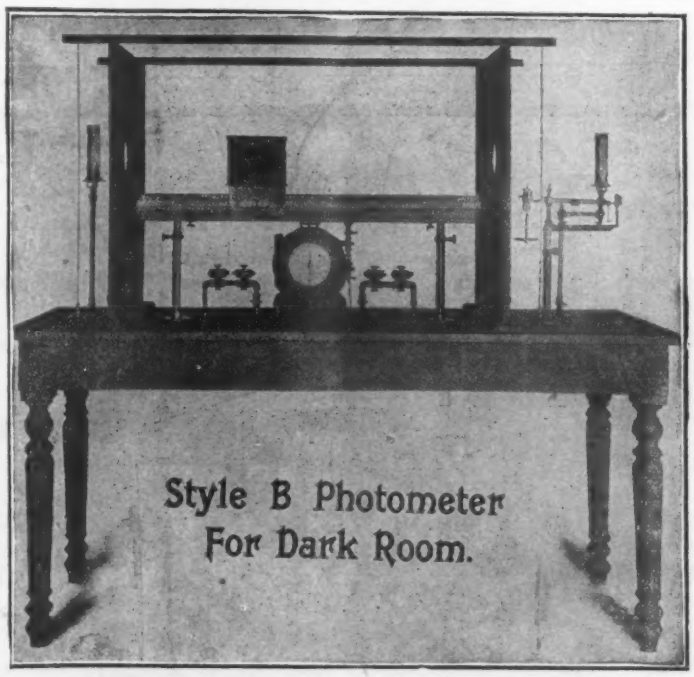
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Tue.	1	12.00 PM	6.00 AM
Wed.	2	1.10 AM	6.00
Thu.	3	2.20	6.00
Fri.	4	3.30	6.00
Sat.	5	4.40	6.00
Sun.	6	No L.	No L.
Mon.	7	No L. FM	No L.
Tue.	8	No L.	No L.
Wed.	9	5.00 PM	7.10 PM
Thu.	10	5 00	8.00
Fri.	11	5.00	9.00
Sat.	12	5.00	10.00
Sun.	13	5.10	11.00
Mon.	14	5.10	12.00
Tue.	15	5.10 LQ	1.00 AM
Wed.	16	5.10	2.00
Thu.	17	5.10	3.00
Fri.	18	5.10	4.00
Sat.	19	5.10	5.00
Sun.	20	5.10	6.20
Mon.	21	5.10	6.20
Tue.	22	5.10	6.20
Wed.	23	5.10 NM	6.20
Thu.	24	5.10	6.20
Fri.	25	5.10	6.20
Sat.	26	5.10	6.20
Sun.	27	5.10	6.20
Mon.	28	9.50	6.20
Tue.	29	11.00 FQ	6.20
Wed.	30	12.10 AM	6.20
Thu.	31	1.20	6.20

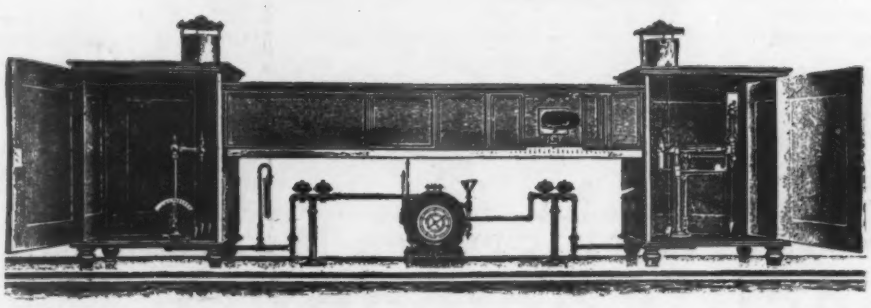
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs. Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

DECEMBER, 1908.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Complete Lighting in One Hour From Time Given P. M.	Complete Extinguishing in 50 Minutes From Time Given A.M.
Tue.	1	4.07	5.52
Wed.	2	4.07	5.52
Thu.	3	4.02	5.57
Fri.	4	4.02	5.57
Sat.	5	4.02	5.57
Sun.	6	4.02	5.57
Mon.	7	4.02	5.57
Tue.	8	4.02	5.57
Wed.	9	4.02	5.57
Thu.	10	3.57	6.07
Fri.	11	3.57	6.07
Sat.	12	3.57	6.07
Sun.	13	3.57	6.07
Mon.	14	3.57	6.07
Tue.	15	3.57	6.07
Wed.	16	3.57	6.07
Thu.	17	3.57	6.17
Fri.	18	3.57	6.17
Sat.	19	3.57	6.17
Sun.	20	3 57	6.17
Mon.	21	3.57	6.17
Tue.	22	3 57	6.17
Wed.	23	3.57	6.17
Thu.	24	4.02	6.22
Fri.	25	4.02	6.22
Sat.	26	4.07	6.22
Sun.	27	4.07	6.22
Mon.	28	4.07	6.22
Tue.	29	4.07	6.22
Wed.	30	4.07	6.22
Thu.	31	4.12	6.27

TOTAL HOURS DURING 1908.

	Hrs. Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguishing time	30.30
Total, yr.	3962.05

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Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schenectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfolk, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.
Arlington, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

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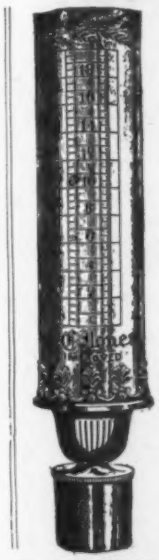

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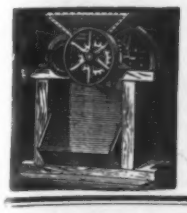

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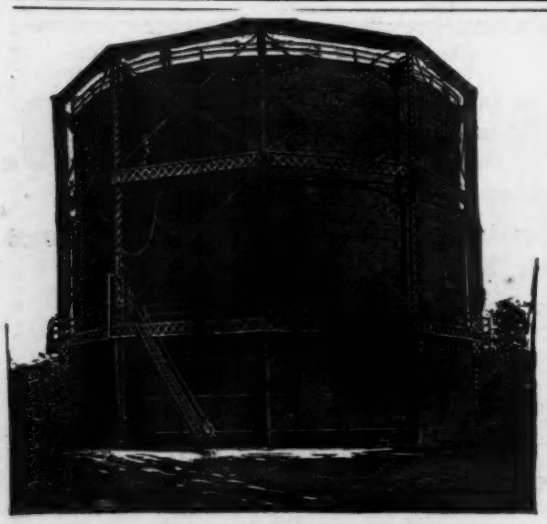

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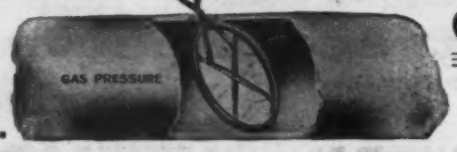

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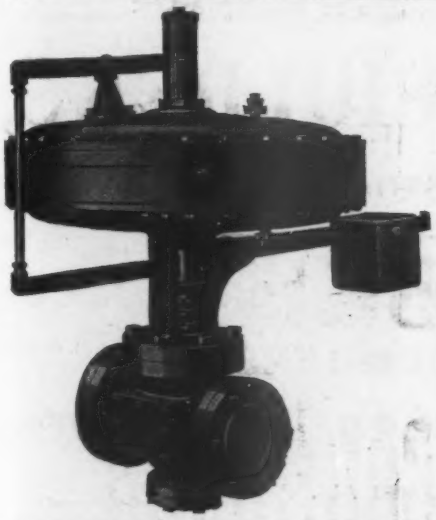

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